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THE DIFFICULTY IN MAKING DIFFERENTIAL DIAGNOSIS BETWEEN ENCEPHALITIS LETHARGICA AND BOTULISM.

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On or about April 20, 1921, Dr. E. C. Dickson, of the Leland Stanford University Medical School, telephoned the writer regarding a possible case of botulism at the Marine Hospital, San Francisco, Calif. He said that the symptoms were of a suggestive character, and that Dr. Ophuls had performed an autopsy. The Marine Hospital was visited, such data were secured from the history as it was possible to obtain, and an effort was made to get definite information regarding the possible source of the disease and to trace the movements of the deceased.

The history as obtained at the Marine Hospital at San Francisco revealed that the patient had worked up to April 1, 1921. He had been "feeling fine" up to four days prior to the onset of the disease, presumably April 9, when he became dizzy and had double vision. Twenty-four hours later, following chills, patient lost control of tongue and could not eat. Every effort was made to trace the source of the disease, but without success.

On April 13 the patient visited a clinic in San Francisco, where he was referred to the Marine Hospital, the definite diagnosis not being given. The clinical record at the Marine Hospital indicates that the patient's chief complaint was inability to swallow and that he had symptoms of dizziness and double vision. The records also show that diphtheria antitoxin was administered on April 13 and 14 and a culture was taken from the throat. The result of the throat culture was negative for diphtheria. Diphtheria antitoxin was again administered on April 15, and on April 19 the patient steadily weakened and became cyanotic, and died April 20.

The temperature chart shows that the patient had a subnormal temperature except at the time of admission and before death. The pulse averaged 120 up to April 17, when an increase was noted.

Blood counts taken on April 18 showed a white count of 21,600, differential count 91 per cent neutrophiles, and red count of 5,500,000.

An autopsy performed by Dr. William Ophuls, of the Leland Stanford University, reported anatomical diagnosis, encephalitis

lethargica; tuberculosis of the lungs, healed; bronchitis, acute; mucopurulent; bronchopneumonia, terminal.

Additional laboratory reports of the microscopical examination of the brain show a slight round cell infiltration, no thrombi, and some accumulation of the leucocytes in and around some blood vessels.

The following additional report upon this particular case was received from Dr. E. C. Dickson, of the Botulism Commission:

MAY 28, 1921.

A piece of the medulla taken at autopsy was given to Dr. E. C. Dickson for examination April 20, 1921. The material was ground up in a sterile mortar and a portion was injected intracranially in a rabbit. The rabbit was sick for several days and almost blinded with a discharge from the eyes, but finally recovered.

The remainder of the ground-up medulla was inoculated into two culture tubes—one of brain medium and the other of meat. Both tubes were oil stratified. The cultures were incubated four days at 37½° C., at which time both tubes had gas and a very foul odor, and there were marked signs of proteolysis.

After a period of about two weeks' incubation at 28° C., the brain culture was filtered and the sterile filtrate was tested against the antitoxins of *B. botulinus* types A and B. The type B antitoxins protected the pig, while the control pig and that injected with antitoxin type A died in 24 hours.

B. botulinus type B, therefore, was isolated from the brain culture of the medulla of this case.

(Signed) GEORGINA S. BURKE.
ERNEST C. DICKSON.

DISCUSSION.

This case is an extremely interesting one. It is regretted that the movements of the patient could not be traced.

The isolation of *B. botulinus* from the brain of this patient (constituting, as it does, the first recorded instance, except that in the case of some experimental animals, yet unpublished) should prove of more than passing interest.

Likewise, it is very evident from this case, the Pueblo, Colo., cases, and those at Battle Creek, Mich., that some official statement should be given out calling attention to the increasing difficulty of proper differentiation between encephalitis lethargica and botulism.

Recent reports, which have made their appearance in the public press and medical literature, and which have even been made the basis for discussion at medical meetings, that many, if not all, of the cases of lethargic encephalitis recently recognized in numerous cities are really botulism caused by preserved food, must be considered incorrect.

Researches conducted as early as 1918 by the Local Government Board in England have proved that sleeping sickness, or encephalitis lethargica, is a separate disease and that it can not be identified with

botulism poisoning. These conclusions have been supported by studies conducted by Netter in France and by Simon Flexner in this country. Moreover, botulism is comparatively rare in the United States, whereas numerous cases of sleeping sickness have been recognized in countries where botulism is unknown and canned foods have not been consumed. Sleeping sickness is a febrile disease, associated with early symptoms of the respiratory tract and distinct inflammatory change in the brain tissue. These lesions are not found in botulism poisoning, and the temperature in this intoxication is usually subnormal. Single, rather than multiple, cases of sleeping sickness have been observed in family and other intimate groups of persons. On the other hand, botulism poisoning affects, as a rule, several members of the same household or institution, and the source of the poison can be traced, by the experienced investigator, to some food. Botulism can be prevented by thoroughly cooking all canned vegetables or fruits which have not been previously processed at high temperatures, after they are removed from the container.

DIRECT INOCULATION TEST FOR B. BOTULINUS TOXIN.

Determination of the Presence of B. Botulinus Toxin by Intraperitoneal Inoculation of Laboratory Animals with Suspected Foods.

By I. A. Bengtson, Bacteriologist, Hygienic Laboratory, United States Public Health Service.

Attention is called to the rapidly fatal effects, with characteristic symptoms, of large doses of toxin and cultures of *Bacillus botulinus* when administered to small laboratory animals, particularly the mouse and guinea pig, by the intraperitoneal route. Results obtained in experiments carried out at the Hygienic Laboratory have suggested the procedure as a simple and expeditious test for the determination of the presence of botulinus toxin in suspected canned foods and, therefore, of use as an aid to the earlier diagnosis of botulism in case the food is available. By direct inoculation of white mice or guinea pigs with the food substance, the delay occasioned by filtration or by isolation of the organism, which may require several days, may be obviated.

The subcutaneous inoculation of guinea pigs or the feeding of the suspected food to chickens has been the method most frequently used in determining the presence of a toxin in suspected food. Graham and Schwarze (1) have recently shown that Type A strains of *B. botulinus* may be identified by feeding suspected contaminated food to chickens, which are not susceptible to the Type B strains. Symptoms appear in from 5 to 6 hours and death occurs after 18 to 24 hours.

The intraperitoneal inoculation of animals is also suggested in the examination of stomach contents for the detection of the presence of *B. botulinus* toxin, and it is possible that inoculation of mice with citrated blood from suspected botulism patients may give a clue to the presence of the toxin in the circulating blood. The method may be used also for the rapid identification and differentiation of the two types of *B. botulinus*, A and B, in experimental work.

That the mouse is highly susceptible to the toxin of *B. botulinus* was observed by von Ermengem, who found that as small a dose as 0.000025 c. c. of toxin was fatal to this animal when inoculated subcutaneously. That massive doses of toxin administered intraperitoneally have a rapidly fatal effect has been recently reported by Orr (2), who states that mice inoculated intraperitoneally died within a period of four hours.

Forssman (3) describes the symptom complex in rabbits and guinea pigs inoculated intraperitoneally or intrapleurally with toxin, as compared with that produced on subcutaneous, intracerebral, or subdural inoculation. In the case of the latter, respiratory symptoms are not pronounced until just before death. Following inoculation into the peritoneal cavity or into the pleura or the lungs, on the other hand, the most prominent symptom is dyspnea, the respiration frequency falling rapidly from 120–160 to 20–30 per minute. The respiration is distinctly costal, with a strong contraction at each breath. Death is ascribed to paralysis of the diaphragm, and Forssman designates this form of botulism as the diaphragmal type. Massive doses of toxin inoculated intraperitoneally or intrapleurally into guinea pigs caused death in 4 hours, whereas the same amount inoculated subcutaneously required 6 hours.

The symptoms as observed in mice in the work here reported are very characteristic and appear to be even more distinctive than in the guinea pig. Soon after inoculation, the animals present a sunken-in appearance at the flanks, which has been described as "wasp-waisted." A pronounced contraction is observable at each breath. In the early stages the number of respirations sometimes appears to increase, but as symptoms develop, there is a gradual decrease in the number of respirations per minute, with increased effort at each breath, until the animal finally succumbs.

EXPERIMENTAL.

Preliminary tests were made with glucose broth cultures of Type A and B strains of *B. botulinus*, with the results indicated in Tables I and II. The inoculations throughout were by the intraperitoneal route unless otherwise indicated.

TABLE I.—*Effect of glucose broth cultures (5 days old) of B. botulinus injected intraperitoneally into mice.*

Number of mouse.	Type of culture.	Amount of culture.	Amount of antitoxin.	Time of appearance of symptoms.	Time of death.
		c. c.	c. c.		
1	B Nevin strain	0.25		3 hours	4 hours.
2	A Memphis strain	.25		2 hours	2½ hours.
3	Do	.25		2 hours	4 hours.
4	A Boise strain	.25		2 hours	2½ hours.
5	B Nevin strain	0.25	[1] 0.25		Survived.
6	A Memphis strain	.25	[2] .25		Do.
7	Do	.25	.25		Do.
8	A Boise strain	.25	.25		Do.

[1] 0.25 c. c. of Type B antitoxin represents about 20 units of Type B antitoxin. (According to the Hygienic Laboratory standard, 1 unit protects against 1,000 minimal lethal doses of toxin.)
[2] 0.25 c. c. of Type A antitoxin represents about 25 units of Type A antitoxin.

TABLE II.—*Effect of glucose broth culture (6 days old) of B. botulinus injected intraperitoneally into mice.*

Number of mouse.	Type of culture.	Amount of culture.	Time of death.
		c. c.	
1	A Boise culture	0.1	2 hours.
2	Do	.01	4 hours.
3	Do	.001	8 hours.
4	Do	.0001	22 hours.

The size of the doses of toxin Type A represented by 0.25 c. c. in Table I may be determined approximately by comparison with Table II. The minimal lethal dose of the Boise culture was less than 0.0001 c. c., and, therefore, 0.25 c. c. represents at least 2,500 minimal lethal doses.

A test was made on guinea pigs to determine the relative effects of inoculating the same amounts of culture subcutaneously and intraperitoneally. Results were obtained much more promptly by intraperitoneal than subcutaneous inoculation.

TABLE III.—*Effect of glucose broth cultures of B. botulinus injected intraperitoneally and subcutaneously into guinea pigs.*

Number of guinea pig.	Culture inoculated.	Amount of culture.	Method of injection.	Time of appearance symptoms.	Time of death.
		c. c.			
1	Glucose broth culture (Type A Memphis strain 8 days old).	2.0	Intraperitoneally		1 hour, 40 minutes.
2	Do	2.0	Subcutaneously	Not before 5 hours.	7 hours.

A series of tests was then carried out with food, and cans of the following foods were inoculated with the Type A Memphis and Boise strains: String beans, peas, spinach, olives, corn, and beets. Inoculations were made by introducing a very small amount of a month-old culture by means of a Pasteur pipette through a hole in the top of the

can, the opening then being closed by solder. Incubation was carried out at a temperature of 37° C.

Two of the cans thus incubated, namely, the peas and corn, became "swells" within from one to two days, showing considerable bulging at both top and bottom. The can of peas inoculated with the Memphis strain was opened on the seventh day and tests were carried out on mice and guinea pigs.

The odor from this can was exceedingly offensive and the peas were more or less disintegrated. Inoculations were made into mice and the results shown in Table IV were obtained.

TABLE IV.—*Effect of intraperitoneal inoculations of mice with cultures of B. botulinus grown in canned peas.*

Number of mouse.	Amount of culture.	Antitoxin administered.	Amount of antitoxin.	Time of appearance of symptoms.	Time of death.
	c. c.		*c. c.*	*Hours.*	
1	1.5				10 or 15 minutes.
2	1.5				Do.
3	1.0				Do.
4	1.0				Do.
5	.5			¾	1¼ hours.
6	.5			¾	1½ hours.
7	1.0	Polyvalent antitoxin	[1] 0.5	1	2½ hours.
8	1.0	Type B antitoxin	[2] .5		About 15 minutes.

[1] 0.5 c. c. of the polyvalent antitoxin represents about 30 units of Type A antitoxin.
[2] 0.5 c. c. of Type B antitoxin represents about 40 units of Type B antitoxin.

The very early deaths (within from 10 to 15 minutes) of the mice receiving doses of 1.0 and 1.5 c. c. can hardly be ascribed to the effect of toxin alone. Even the mouse receiving polyvalent antitoxin (No. 7) succumbed, though after a longer period. Further tests were then made with smaller amounts of culture, the results of which are shown in Table V.

TABLE V.—*Effect of intraperitoneal inoculations of mice with cultures of B. botulinus grown in canned peas.*

Number of animal.	Amount of culture.	Antitoxin administered.	Amount of antitoxin.	Time of appearance of symptoms.	Time of death.
Mouse:	*C. c.*		*C. c.*		
1	0.5			30 minutes	1 hour 10 minutes.
2	.5			35 minutes	2 hours 35 minutes.
3	.1			55 minutes	1 hour 20 minutes.
4	.1			40 minutes	2 hours 10 minutes.
5	.01			1 hour 25 minutes	2 hours.
6	.01			do	2 hours 15 minutes.
Controls:					
7	.5	Polyvalent antitoxin	[1] 0.5		Survived.
8	.1	do	.5		Do.
9	.01	do	.5		Do.
10	.5	Type B antitoxin	[2] .5		30 minutes.
11	.1	do	.5	30 minutes	1 hour 45 minutes.
12	.01	do	.5	1 hour 50 minutes	2 hours.
Guinea pig:					
1	[3] 1			2 hours 20 minutes	3 hours.
2	[3] 1	Polyvalent antitoxin	[4] 1	2 hours 50 minutes	16 hours.
3	[4] 1			do	3 hours 45 minutes.
4	[4] 1	Polyvalent antitoxin	[4] 1		Survived.

[1] 0.5 c. c. of the polyvalent antitoxin represents about 30 units of Type A antitoxin.
[2] 0.5 c. c. of Type B antitoxin represents about 40 units of Type B antitoxin.
[3] Intraperitoneally.
[4] Subcutaneously.

The results obtained with the guinea pigs indicate that the administration of the antitoxin by the subcutaneous route, when the culture had been administered intraperitoneally, was not effective in this particular instance in neutralizing the toxin, probably because of the slower absorption when administered by this route and the great potency of the toxin.

The almost immediate death of the mice inoculated with the larger amounts of culture as shown in Table IV (1.5 c. c. and 1 c. c.) prompted the testing of a filtrate of the culture to determine whether the same amounts of this would cause death in as short a time. The mouse inoculated with 1½ c. c. of the filtrate became prostrated within from 5 to 10 minutes and died within 30 minutes, whereas the mouse inoculated with 1 c. c. also developed symptoms very early and appeared to be in a dying condition within 15 minutes, but later revived and then developed more severe symptoms and died in 2 hours and 10 minutes.

It has been suggested that excessive amounts of ammonia, which is evolved in the decomposition of proteins, might have been responsible for the very early effects produced in the mice receiving large doses. The behavior exhibited by the last mouse described above would point to some other substance than the toxin as being responsible for the early prostration.

The remaining cans were opened on the eighth day (string beans, spinach, olives, beets), the ninth day (corn), and the tenth day (string beans), and 1 c. c. of the juice of each can was inoculated into mice. The mice inoculated with samples from the two cans of string beans showed definite symptoms in less than 8½ hours and died in less than 22½ hours. The mouse inoculated with the spinach juice died in less than 22½ hours, no symptoms being observed up to 8½ hours. The remaining two mice inoculated with the samples from the canned beets and olives survived. Control mice inoculated with 0.5 c. c. of antitoxin and the same amounts of the food substances survived.

It can not be stated with certainty that toxin developed in the cans of spinach, olives, beets, and string beans, since they exhibited no offensive odor, nor was there any swelling of the cans as evidence of growth. It is possible that the small amount of inoculum may have contained sufficient toxin to account for the development of symptoms in animals. This being the case, the results obtained with the string beans and spinach would, nevertheless, show the value of the tests for demonstrating small amounts of toxin.

Two mice were inoculated with 0.25 c. c. each of the juice of the canned corn on the tenth day, one being protected by 0.5 c. c. of polyvalent antitoxin. Symptoms developed in the unprotected mouse in 1 hour, followed by death in 2 hours and 20 minutes. A

control mouse inoculated with 0.5 c. c. of normal horse serum instead of antitoxin died in 1¼ hours. The protected mouse survived.

A single experiment was carried out to determine whether toxin might be present in appreciable amounts in the circulating blood of guinea pigs which had been fed with cultures. Two guinea pigs of 250–400 grams weight were fed with cabbage on which was sprayed 3 c. c. of a 9-day-old glucose broth culture of the Memphis strain. The following morning one pig was found dead and the other showed severe symptoms. The latter pig was bled from the heart and the blood collected in sodium citrate. Mice were then inoculated intraperitoneally with the citrated blood and also with the serum from some of the whole blood which had been allowed to clot, with the results recorded in Table VI.

TABLE VI.—*Effect of intraperitoneal inoculations of mice with the blood from guinea pigs affected with botulism.*

Number of mouse.	Amount of blood.	Symptoms.	Death.
	c. c.		
1	0.0001		Survived.
2	.001		Do.
3	.01		Do.
4	.1	22½ hours	27½ hours.
5	.5	4 hours	10½ hours.
6	1.0	2½ hours	23½ hours.
7	[1].5	Before 3 days 21 hours	3 days 21½ hours.

[1] Serum.

Control mice inoculated with 1 c. c., 0.5 c. c., and 0.1 c. c. of citrated blood from a normal guinea pig survived.

It is questionable whether toxin would be present in sufficient amounts in the blood of persons suffering with botulism to be detected by this method, but it is nevertheless suggested as a possibility.

DISCUSSION AND SUMMARY.

The results of the experiments here presented indicate that the intraperitoneal inoculation of mice or guinea pigs with suspected foods is a useful method for the quick determination of the presence of the toxin of *B. botulinus* in foods and for determining the type of organism present. By the inoculation of a series of three mice, one with culture alone, one previously inoculated with Type A antitoxin, and another with Type B antitoxin, it may be possible to determine within a short time which type is the causative organism and therefore which type of antitoxin should be used for treatment. In order to approximate the correct dose of toxin, it is suggested that 3 series be thus inoculated; one with 1.0 c. c. of culture, one with 0.5 c. c., and one with 0.1 c. c. Mice seem to be more favorable

than guinea pigs for carrying out the tests, for the reason that symptoms usually develop more rapidly in mice and are more characteristic.

The length of time required for symptoms to develop is doubtless dependent on the amount of toxin present. The results of the tests carried out with the canned peas show how very rapidly fatal effects are brought about in laboratory animals when a large amount of toxin is present. In practice, food containing such excessive amounts of toxin would not, perhaps, be submitted for examination, as it is improbable that food in the condition exhibited by this particular can would ever be used for human consumption. It is, however, reasonable to conjecture that symptoms and death of mice inoculated with such foods as have been implicated in the recent outbreaks would occur within a reasonably short period and in time to be of material assistance in the diagnosis of the disease and the determination of the type of organism present.

REFERENCES.

1. 1921. Graham and Schwarze, Avian Botulism (Type A) or Limber Neck: Jour. Infect. Dis., 28, 317–322.

2. 1921. Orr, P. F., Studies on Bacillus Botulinus: Jour. Med. Res., 42, 127–136.

3. 1901. Forssmann, J., Beiträge zur Kenntnis der Bakteriologie des Botulismus (Lunds Univ. Arskr. 1900.): Centralbl. f. Bakt. 1 Abt., 29, 541–545.

AN EPIDEMIOLOGICAL STUDY OF THE 1920 EPIDEMIC OF INFLUENZA IN AN ISOLATED RURAL COMMUNITY.

By Chas. Armstrong, Assistant Surgeon and Epidemiologic Aide, United States Public Health Service, with the Ohio State Department of Health; and Ross Hopkins, Assistant Epidemiologist, Ohio State Department of Health.

At a conference of Public Health Service officers held in Washington, D. C., in February, 1920, the desirability of making a series of intensive epidemiological studies of influenza in rural communities was discussed, and it was decided that the epidemiologic aides in the various States should undertake such studies as opportunities might present. Kelleys Island was selected for making this study in Ohio, because of its exceptional isolation and because of the severity of the 1920 epidemic at this place.

The Community Where This Study Was Made.

Kelleys Island, a political subdivision of Erie County, Ohio, is located in Lake Erie, about 12 miles north of Sandusky, 5 miles from Lakeside, and about the same distance from Put-in-Bay. The

island comprises some 2,900 acres of land, is of limestone formation, and rises but a few feet above the level of Lake Erie.

Population.—During the influenza epidemic of January and February, 1920, there were 689 persons upon the island, all of whom are white. The Kelley Island Lime and Transport Co. operates a limestone quarry and crusher on the island, employing from 100 to 300 men—the smaller number being employed during the winter months when the lake traffic is impossible. Grape growing, peach culture, and fishing are other chief occupations upon the island. From the nature of these industries it is apparent that there is a demand for labor during the late spring, summer, and fall months. This demand is met by the influx of a considerable number of persons each spring, who find employment for the most part at the quarries and who return to the mainland at the approach of the closed season for navigation. The winter population, however, is composed almost entirely of established families who have lived upon the island for several years and thus constitute a community whose members are almost universally acquainted with one another—a condition of some advantage, perhaps, in tracing exposure, contacts, etc.

General considerations.—Housing conditions upon the island are good; the homes are well separated, of better than average construction, and the number of houses is far in excess of the requirements of the winter population.

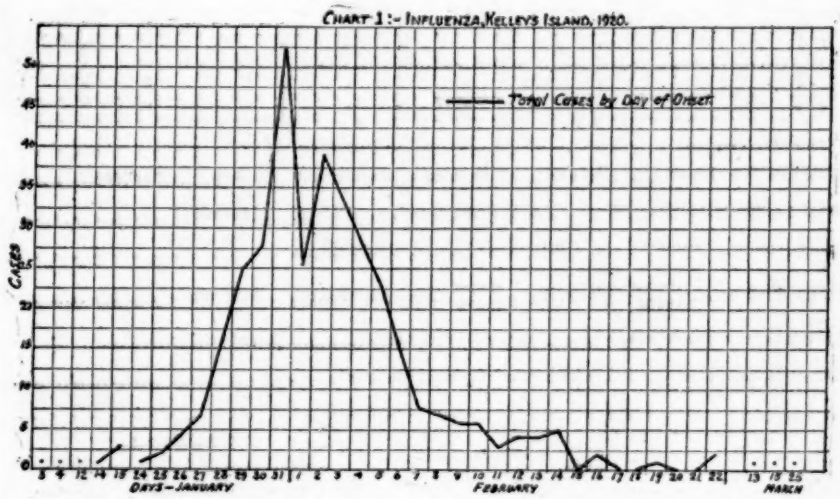
During the winter months, communication with the mainland is limited, crossing over at this time of the year being not only difficult but often dangerous as well. Mail is delivered to and from the island daily, conditions permitting, by carriers who reside upon the island and during the winter months carry the mail between the latter and Lakeside, a summer resort which is almost entirely deserted in winter. The island possesses no public water supply, sewer system, theater, moving-picture theater, restaurant, village pump, nor street cars or other means of public conveyance. One central school for both grammar and high-school pupils, one church conducting worship regularly during the winter of 1919 and 1920, and another holding services at intervals, five general stores, a butcher shop, a confectionery parlor, two pool rooms, and a post office afford possible places of contact for the general public. Ice boating, sleigh riding, ice fishing, dancing, and parties are the chief winter amusements of the younger people.

Epidemiological Study.

The epidemic of 1920 may be said to have begun sharply on January 24, to have reached its peak on January 31, and then to have fallen somewhat less sharply until February 16, when new cases practically ceased to appear. (See Chart 1.)

The present study was begun on February 19, 1920, and was carried to completion just as rapidly as the writers could visit the families and secure the desired information.

Upon arrival at the island the purpose of our visit was made known and the people were requested to remember, or to mark upon their calendars, the dates upon which various members of the household became ill. The dates of onset as secured in the household canvass were then checked as far as possible against the school records and the time sheets of the Kelley Island Lime and Transport Co., which were kindly placed at our disposal for this purpose. These checks, together with the cross checks secured through contact, histories, etc., between individuals, render us quite confident of the accuracy of these data.



The survey.—The house-to-house survey, begun on February 19, was conducted wholly by the writers and was completed on March 7, a record having been secured of every person upon the island. A resurvey, begun on March 21, for the purpose of locating new or recurrent cases, was completed in seven days.

The forms used in collecting the information for this study were prepared by Surg. W. H. Frost, of the United States Public Health Service, following a conference with the epidemiologic aides from several States. Form I was used for collecting the household record, general sanitary conditions, and similar information, and Form II for securing an individual record of contact, symptomatology, etc., for each member of the household.

Form L.

INFLUENZA SURVEY, 1920.

FAMILY NO.....ADDRESS.....

HOUSEHOLDER: Name..... Occupation.....

Pers. No.	Census of household.					Influenza record.				Prev. pneum. year.
						1918		1920		
	Names.	Rel.	Col.	Sex.	Age.	Typ.	Month.	Typ.	Date.	
1										
2										
3										
4										
5										
6										
7										
8										

Transients.....

DWELLING: Isolated.....detached.....terraced.....apartment.....shop.....boarding.....

Other families in building: No.....Common entrance?.....Toilet?.....Laundry?.....

Rooms occupied: Total.....Bedrooms.....Heating.....

Toilet: Kind.....{house / yard} Water.....{house / yard} Hot water?.....Bathroom.....

Estimate of: Economic status.....General sanitation.....Housing.....

Circumstances and extent of this family's association with others.....

Notes.	Record of visits.		
	Dates.	Investigator.	New cases.

Form II.

INDIVIDUAL RECORD.

FAMILY NO..... PERSON NO. ..... Name .....

Color..... Sex..... Age..... Occupation.....

Place of occupation.....

PERSONAL HISTORY: Physique..... Nourishment..... Previous health.....

Susceptibility to resp. infections.....

CIRCUMSTANCES OF PREVIOUS CONTACT.

1. Case in family.....
2. Case outside family.....
3. Indirect contact.....
4. General public.....

.....

SUMMARY: .....

.....

CLINICAL RECORD.

Diagnosis..... Termination..... Doctor.....

DATE: Onset.....to bed..... Doctor's first call.....

Mode of Onset: Sudden..... Gradual..... Chill..... Epistaxis.....

SYMPTOMS: Fever..... Height..... Duration.....

Coryza..... Pharyngitis..... Conjunctivitis.....

Bronchitis..... Expectoration.....

PAIN: Degree..... Localization: Head..... Back..... Limbs..... Other.....

Nausea..... Vomiting..... Bowels.....

Prostration: Degree..... Duration.....

PNEUMONIA: .....

.....

NOTES: .....

SUMMARY: Type illness..... Days sick..... In bed.....

Medical and nursing.....

Diagnosis.—Unfortunately, during the 1918 epidemic no epidemiologic record was made of the influenza outbreak upon the island; consequently, the information as to this outbreak is confined to a statement of the individual made during the canvass of 1920, as to the presence or absence of an attack in 1918, together with a statement of the preventive measures practiced at that time.

The island outbreak of 1920, coming, as it did, at a time when influenza was epidemic over a large portion of the United States and displaying the features of a rapid spread, high attack rate, and a typical symptomatology in the majority of cases, gives no room to doubt that the outbreak was one of influenza.

The diagnosis in individual cases was made from a careful study of the epidemiologic circumstances in the household and of the symptoms as related by the patient, or, in the case of young children, and a few persons not seen, by other members of the family. As is to be expected, the epidemiology is not always helpful and the symptoms are sometimes so mild or atypical as to leave reasonable doubt as to the nature of the ailment. These cases of uncertain type have been recorded, for the purpose of this study, as of doubtful nature, 25 such cases having been found. This number is relatively so small and their distribution so uniform, however, as to render them unimportant in so far as the general picture of the epidemic is concerned. Moreover, the absence of sickness among the islanders prior to and following this epidemic renders it probable that some, at least, of these atypical cases were influenza, and for these reasons these cases have been carried in the totals throughout this study.

The relative frequency of the various symptoms as related by the informants in the 369 cases is given in Table I.

TABLE I.—*Relative frequency of various symptoms, as related by the informants, in 369 cases of influenza on Kelleys Island, 1920.*

Symptom.	Present.	Absent.	Undetermined.	Per cent present.
1. Prostration	298	47	24	86
2. Cough	279	86	4	76
3. Headache	228	105	36	68
4. Coryza	219	144	6	60
5. Backache	190	130	49	59
6. Chilliness	191	138	40	58
7. Expectoration	175	182	12	49
8. Pain in limbs	158	164	47	49
9. Nausea	133	220	16	38
10. Sore throat	123	215	31	36
11. Vomiting	124	243	2	34
12. Pain in chest	105	225	39	32
13. Other pain	77	255	37	23
14. Nosebleed	68	294	7	19

Measures of suppression.—The appearance of influenza in 1920 found the island in a period of transition from the old to the new health régime under the Ohio Griswold act, hence, essentially without public-health machinery. Owing to this fact and to public apathy no repressive measures were instituted. The school did close on January 30, but only after illness among so many teachers and pupils rendered its continuance impossible. All other collective activities upon the island, church services, poolroom, recreation parties, etc., continued, the people not even being warned to exercise individual care. The only island physician, Dr. H. M. Jump, administered to the ill until February 13, when he fell a victim to influenza-pneumonia, of which he died some eight days later. An outside physician was

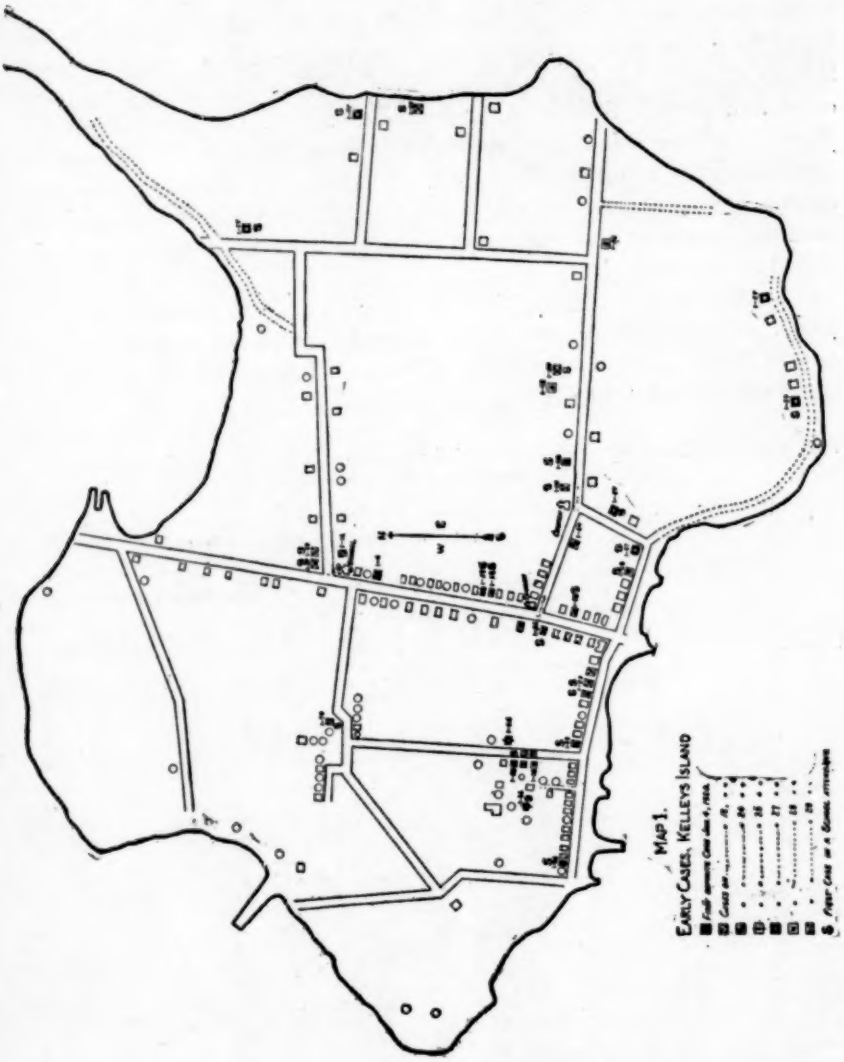
then secured. The nursing situation was handled entirely by the islanders themselves, no skilled assistance being available.

Shore communication.—The formation of ice during the early part of January rendered crossing difficult, until it had frozen to sufficient thickness to support the weight of a man. The first person is said to have crossed on the ice on January 21. For some days prior to this time the somewhat irregular trips of the mailman were the only means of shore communication. The weather remained cold, however, and the ice thickened, and on January 27 the first automobile drove over the ice to the mainland. From January 21 onward an undetermined number of people, of whom we have only partial record, visited the island, and a small number of islanders visited the mainland more or less regularly. The epidemic may be said to have begun on January 24.

The attack rate.—Among the 689 people upon the island during the course of the epidemic, 369 were affected—an attack rate of 53.5 per cent. There were two fatalities. The distribution of the population and cases by age and sex is given in Table II:

TABLE II.—*Sex and age distribution of the population and of cases of influenza and doubtful illness on Kelleys Island, 1920.*

Age (years).	Population.			Cases of influenza and doubtful illness.											
				Definite influenza.			Doubtful cases.			Influenza and doubtful.					
										Total cases.			Attack rate.		
	Male.	Female.	Both sexes.	Male.	Female.	Both sexes.	Male.	Female.	Both sexes.	Male.	Female.	Both sexes.	Male.	Female.	Both sexes.
Under 1	9	4	13	4	0	4	1	0	1	5	0	5	56	0	38
1–4.....	42	36	78	26	20	46	3	1	4	29	21	50	66	58	64
5–9.....	39	40	79	22	21	43	1	1	2	23	22	45	59	55	57
10–14...	36	43	79	20	21	41	1	1	2	21	22	43	58	51	54
15–19...	27	24	51	17	11	28	0	1	1	17	12	29	63	50	57
20–24...	16	27	43	7	13	20	0	2	2	7	15	22	44	56	51
25–29...	25	23	48	11	17	28	1	1	2	12	18	30	48	78	62
30–34...	28	27	55	17	16	33	0	0	0	17	16	33	61	59	60
35–39...	17	20	37	9	10	19	0	0	0	9	10	19	53	50	51
40–44...	21	16	37	8	8	16	1	1	2	9	9	18	43	56	49
45–49...	22	17	39	8	5	13	0	0	0	8	5	13	36	29	33
50–54...	22	16	38	13	8	21	0	2	2	13	10	23	58	62	61
55–59...	21	13	34	8	4	12	1	2	3	9	6	15	43	46	44
60–64...	10	6	16	3	3	6	0	0	0	3	3	6	30	50	37
65–69...	12	9	21	3	5	8	2	0	2	5	5	10	42	55	48
70 and over..	10	11	21	3	3	6	1	1	2	4	4	8	40	36	38
Total.	357	332	689	179	165	344	12	13	25	191	178	369	53.5	53.6	53.5


MAP 1.
EARLY CASES, KELLEY'S ISLAND

Early cases.—Cases of doubtful diagnosis which may have been mild or atypical influenza occurred as follows: One in November, one about December 12, one about December 25, one January 1, three about January 15. None of these cases had been off the island, two were infants, and the others were adults. No connection could be traced between these cases, nor between these and subsequent cases.

The first clinically definite case of influenza developed January 3 in a carpenter who lived by himself, had not been off the island since November, had had no visitors from shore, and had been in very limited contact with island people. To his knowledge he had been in contact with no ill persons. He had received some Christmas packages, including eatables, from the mainland during the latter part of December.

The next clinically definite case occurred on January 12 in a machinist, whose family consisted of himself and wife, the latter becoming ill with the same ailment two days later. These people had not been off the island during the winter, had received no visitors from the mainland, and had had no known contact with ill people. The source of infection is therefore unknown. The next case appeared 12 days later, on January 24, in the wife of a fisherman. She had not been outside her own yard since the birth of her baby, which was 6 months old, and had had but few visitors, none of whom seemed to be ill. Her husband became ill on January 25.

On January 26 four cases developed in members of two foreign families, which were neighbors, three of the patients being school children and the other a quarry workman. These early cases were well scattered over the island (see Map 1), and, with the possible exception of the cases of January 26, no connection could be traced between them. During January 27, 28, and 29 influenza made its appearance in 29 island homes and in 25 of these the first case was in a school attendant. (For distribution of these early cases upon the island see Map 1.)

Chronology.—The chronology of the epidemic by day of onset may best be studied by referring to Table III and Chart 1. From a consideration of this chart it will be seen that the epidemic, which may be said to have begun on January 24, reached its highest point on January 31, on which day 52 new cases appeared. On February 1 there was a remission to 24 cases and then followed a rise to a second peak on February 2, on which day 39 new cases occurred. From this date there was a rather rapid decrease in the number of cases until, on February 16, new cases practically ceased to occur.

TABLE III.—*Incidence of influenza and doubtful cases, by sex and by days, in the total population on Kelleys Island, 1920.*

	Nov.	Dec.		January.															February.																									March.			Unknown.	Total cases.
		12	25	1	3	4	12	14	15	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	13	15	28		
Total population:																																													
Influenza	...	...	...	...	1	1	1	1	...	1	1	4	7	15	24	28	52	23	39	35	27	23	14	8	5	5	3	2	3	3	4	...	2	...	...	1	...	...	2	1	1	1	1	[1] 339
Doubtful	1	1	1	1	...	...	...	...	3	...	1	...	...	...	1	...	...	1	...	...	3	...	...	...	1	2	3	1	1	1	1	...	...	...	...	1	...	...	...	...	...	...	...	[2] 24
Total	1	1	1	1	1	1	1	1	3	1	2	4	7	15	25	28	52	24	39	35	30	23	14	8	6	7	6	3	4	4	5	0	2	0	0	2	0	0	2	1	1	1	1	363
Males:																																												
Influenza	...	...	...	...	1	...	...	...	...	...	1	4	3	6	13	10	23	12	22	17	17	13	8	6	4	2	3	1	3	3	3	...	1	...	...	...	...	...	1	1	1	...	...	...	178
Doubtful	1	1	1	...	...	...	...	...	1	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	2	2	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	12
Total	1	1	1	...	1	...	...	...	1	...	2	4	3	6	13	10	23	13	22	17	17	13	8	6	4	4	5	1	4	3	3	...	1	...	...	1	...	...	1	1	1	...	...	...	190
Females:																																												
Influenza	...	...	...	...	...	1	1	1	...	1	...	...	4	9	11	18	29	11	17	18	10	10	6	2	1	3	...	1	...	...	1	...	1	...	...	1	...	...	1	...	1	1	1	161
Doubtful	...	...	...	1	...	...	...	...	2	...	...	...	...	...	1	...	...	...	...	...	3	...	...	...	1	...	1	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	12
Total	...	...	...	1	...	1	1	1	2	1	...	...	4	9	12	18	29	11	17	18	13	10	6	2	2	3	1	2	...	1	2	...	1	...	...	1	...	...	1	...	1	1	1	173

[1] Exclusive of 5 cases ill off the island.

[2] Exclusive of 1 case ill off the island.

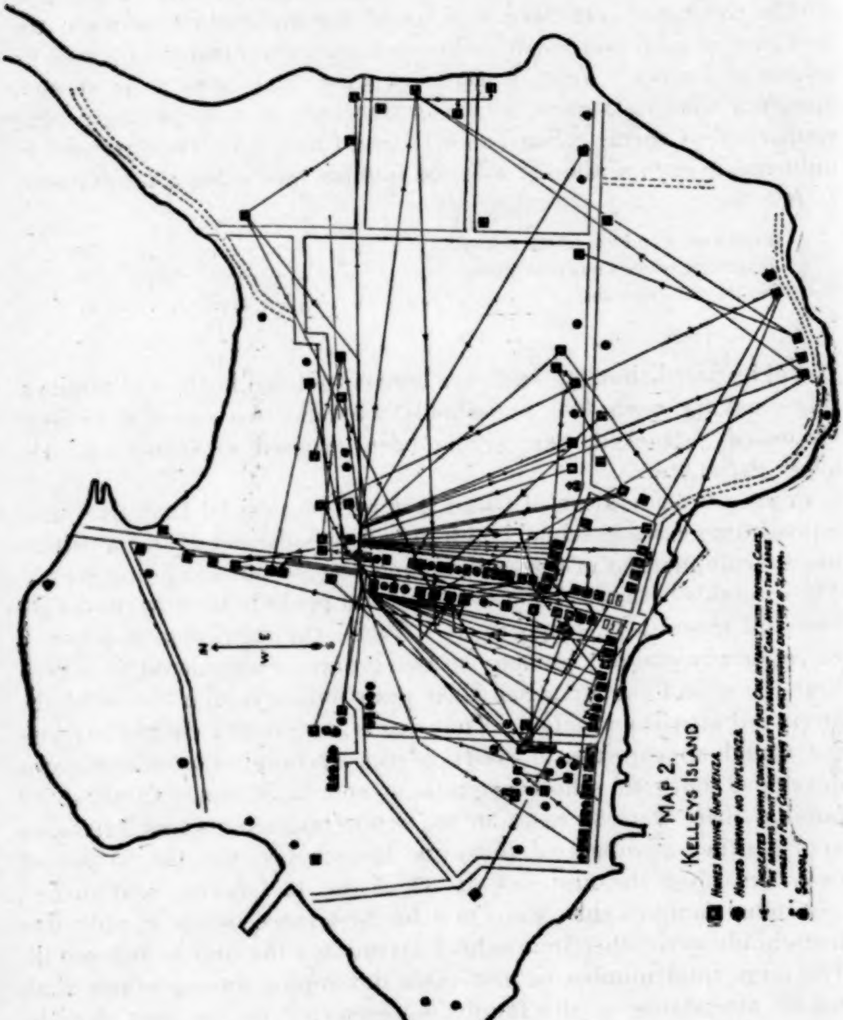
FACTORS INFLUENCING THE SPREAD.

School.—The rate of diffusion of the disease over the island is perhaps best indicated by the dates of onset of the first cases to occur in the individual households, since subsequent cases in the family may be, and probably are in many instances, due to contacts within the home. In Map 2, lines of known contact between the first case in each house and earlier cases are graphically indicated by means of arrows. From a study of these first cases it is at once apparent that contact at school is traceable in a surprisingly large proportion of them. (See Table IV and Chart 2.) The first case of influenza in each of the 112 affected families developed after exposure as follows:

Following exposure in the schools	39
Following other known exposure	51
No known exposure	27
Total	117

It will be noted that 117 cases are here considered in the 112 families, there having been five households wherein two cases were synchronously attacked, one having been exposed at school and the other elsewhere.

From a consideration of Chart 2 it will be noticed that the curve representing cases in school children had two distinct peaks, a feature less sharply marked in the cases among persons not attending school. The intervals between the first and second peaks in the two curves are two and three days, respectively. When the maximum number of cases for any one day among the two groups is considered, it is seen that the school cases reached their peak five days in advance of the group not attending school. That this is more than a chance happening would appear from a study of the 42 families in which cases developed both in school attendants and in others. In these 42 families there were 81 cases among school attendants and 126 cases among other members of the same households; yet the 81 school cases furnished the first case in 32 of the 42 families, and in five additional families they were tied for first place, while in only five households were other than school attendants the first to become ill. The large total number of first cases developing among others than school attendants in the family is accounted for, in part, by the considerable number of households in which no school attendants resided or in which the school attendants were not ill. Referring to Table IV and Chart 3, it is seen that the two curves which represent the total cases, by day of onset, among school attendants and others, are similar, in that each presents two peaks, but that peaks in the curve which represents the daily occurrence of cases among school attendants are two days ahead of the respective peaks in the similar curve for cases not attending school.

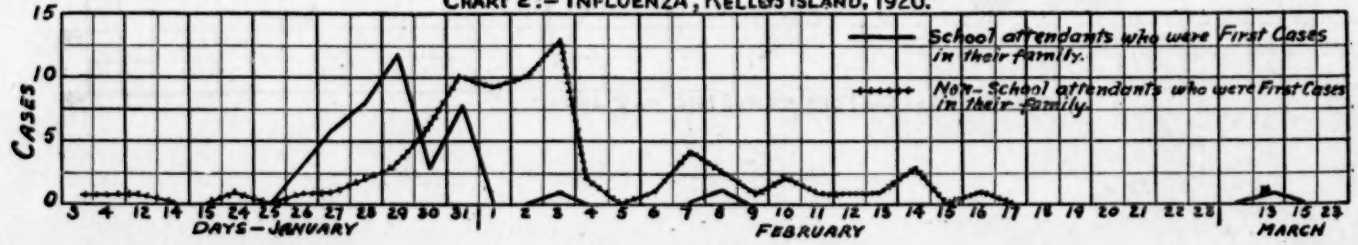


Map 2.
Kelleys Island

TABLE IV.—*Incidence of influenza in various groups, in relation to school attendance, Kelleys Island, 1920.*

	Nov.	Dec.		January.														February.																		March.			Unknown.	Total cases.
		12	25	1	3	4	12	14	15	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	13	15	23		
First cases:																																											
School attendants												3	6	8	14	3	8		1	1				1	1															1			47
Persons not attending school				1	1	1			1		1	1	2	3	6	10	9	10	13	2		1	4	3	1	2	2	2	1	3		1											81
Total cases:																																											
School attendants												3	6	10	19	7	19	4	1	2	4	2	2	1	1	1					1					1				1	1	1		87
Persons not attending school	1	1	1	1	1	1	1	1	3	2	2	1	1	5	6	21	33	19	38	33	26	23	12	7	6	5	6	3	4	4	4		2						2			1	267
Cases in families having school cases, the latter excluded	1		1							2	1			1	3	5	16	25	10	22	12	9	5	3	1		1	2		1	2	1							2				126
Cases in families having no cases in school attendants		1	1		1	1	1	1	1	1	2	1		2	1	5	8	9	16	21	18	16	9	6	6	4	4	3	3	2	3		2									1		150
Cases in families having school attendants, the latter not ill												1					1	1	2	2	2		3	1			1	1		1												1		17
Total school cases:																																											
Pupils who ate dinner at home													2	3	7	3	12	4	1		2	2		1	1	1															1	1		41
Pupils who carried dinner to school												3	4	7	12	4	7			2	2		2								1					1				1			46

CHART 2:- INFLUENZA, KELLEYS ISLAND, 1920.



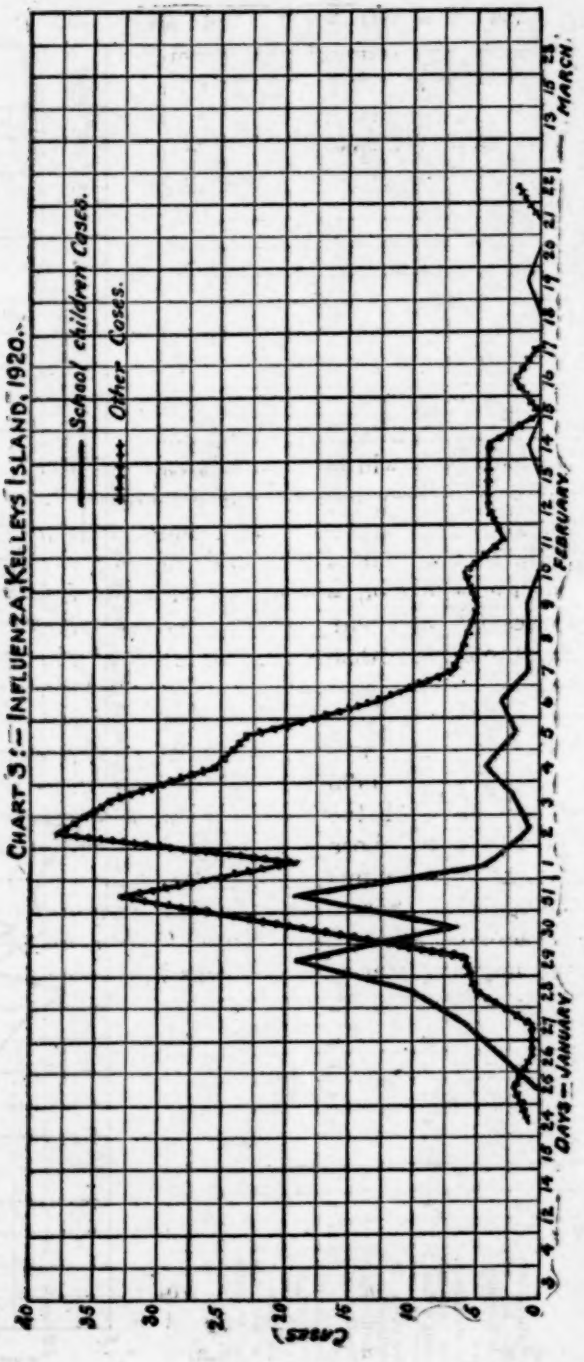


CHART 3:- INFLUENZA, KELLEYS ISLAND, 1920.
School children Cases.
Other Cases.
Cases.
DAYS - JANUARY
FEBRUARY
MARCH.

This earlier occurrence of the epidemic among school attendants might be explained by assuming, first, a common source of infection for school and nonschool cases, and that the school children, being in a special age group, possess a shorter period of incubation; second, that the school offered a special opportunity for infection. If the latter assumption be true, it would seem that school attendants who spend the greater time at school might be affected somewhat more frequently and earlier than those spending less time, and it was thought that a comparison of the school children who carried their dinners to school, with those who went to their homes for lunch, might furnish a test of this hypothesis. Reference to Table IV will show that there were 46 school cases among 80 school attendants who carried their dinners, and 41 cases among 77 who did not carry their dinner, or attack rates of 57.5 and 53.2 per cent, respectively. Referring to Chart IV it will be seen that cases in those pupils who ate their dinners at school had a definite tendency to occur earlier than cases in those who went to their homes for lunch; for in this group 30 cases (65 per cent of the total) developed before, and 16 after, the closure of school, whereas in those who went home for dinner, 15 cases (37 per cent) occurred before, and 26 after, the closure of the school, notwithstanding the fact that those who carried their dinners lived for the most part in the more remote portions of the island where one would expect them to be less exposed to early infection through contact with the general island population. These two groups of school attendants, moreover, are fairly comparable in respect to age, although there is a somewhat larger proportion of younger children among those who carry their dinner than in the other group. As will be mentioned later, however, the primary room had the lightest attack rate of any room in the school. Again, if the school actually served as a center for the dissemination of influenza, one might expect that the nonschool-attending members of families having children in school, one or more of the latter developing the disease, would suffer earlier than the members of households where no school attendants resided; while if all were exposed equally through a generalized or common source of infection, and the earlier occurrence of cases among school children is due to a shorter period of incubation, there should, it would appear, be no great difference in the curves representing the chronology of the epidemic in the two groups of people, since the two groups are similar in all particulars excepting exposure to school attendants.

Referring to Table IV, and Chart 5, which represent the daily occurrence of new cases in the two groups, it may be seen that there is not only a marked difference in the character of the curves, to be considered later, but that the people associated with school cases reach the maximum number for any one day three days in advance

CHART 4:- INFLUENZA, KELLEYS ISLAND, 1920.

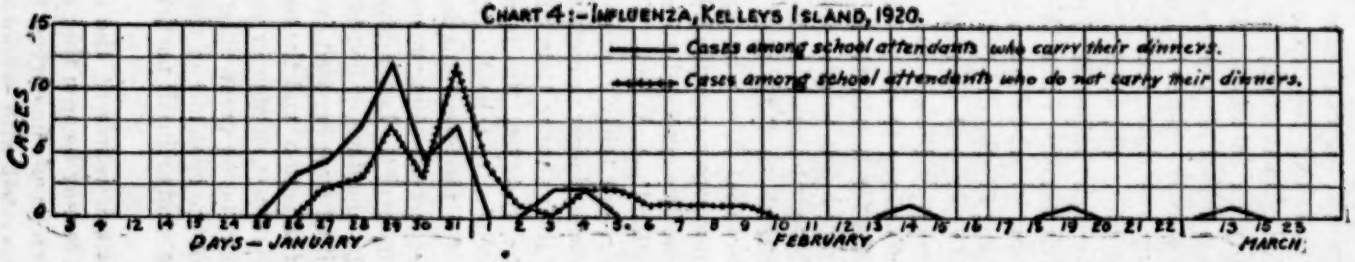
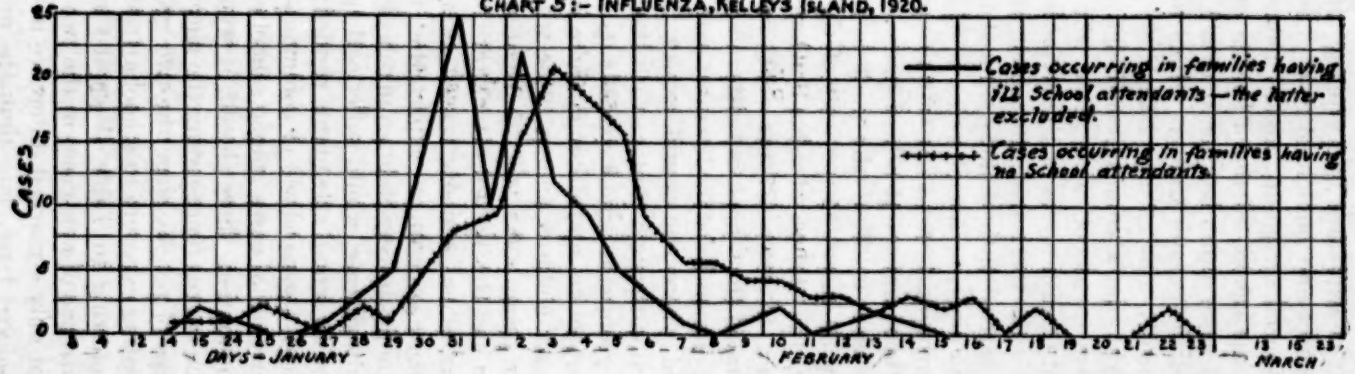


CHART 5:- INFLUENZA, KELLEYS ISLAND, 1920.



of those not associated with the school cases. It is difficult to explain these facts on other assumptions than that the school was a source of disseminating the infection. (A small group associated with school cases who were not ill is given in Table IV, but their number is too small to indicate whether children who were exposed but did not become ill may or may not have carried infection.) That this conclusion is correct is, we believe, also indicated by comparing the curve which represents the daily occurrence of new cases among the individuals attending school or in contact with school attendants, with the graph for the remainder of the population (Charts 2 and 5). It will be seen that the curves representing the chronology of the epidemic among school exposures have two peaks; whereas the curve for the nonschool exposures is a relatively smooth curve of one peak, and it may be that the remission in the epidemic among the former group is related to the closure of the school. On January 28 there were 18 pupils absent from school; on January 29, owing to the illness of a teacher, the second room was not in session, and 58 pupils were absent; and on January 30, owing to the illness of another teacher, another room was not in session, and on that day 88 pupils were absent. School did not open on January 31, nor thereafter until the epidemic had subsided.

It seems that the first wave of influenza among the school attendants (Chart 3) is definitely due in some way to school exposure as described above, and the remission of January 30, it would seem, may be due to the dismissal of a portion of the rooms and to a thinning out of the remainder of the pupils, which certainly would render the school a less efficient means of exposure. This conception, moreover, coincides with what we believe is the probable incubation period of the disease, as will be discussed later. The second increase in daily occurrence of cases among school exposures, as shown in Charts 2, 3, and 5, corresponds rather definitely with the increase among the associates who did not attend school, and is probably due to the same general causes.

If we admit that the school was instrumental in spreading the disease, it naturally becomes of interest to ascertain the circumstances conducive to the spread of the epidemic among the pupils. The seating arrangements and plan of the various schoolrooms, together with the dates of attack, etc., are shown graphically in Figure 1. The school building is a large, brick structure, centrally situated on the island. There are six rooms in the building, four of which are used as study and recitation rooms, and two for recitations only, various classes going to them for a few minutes each day. The building is heated by hot air furnaces located in the basement. The water supply is from a large cistern, which stores the water collected from the roof at time of rainfall. No water had been

permitted to enter the cistern for over two months. A large stone vessel, kept filled with this rain water and supplied with a vertical type of bubbler, which may be touched by the lips, holds the drinking water. There are no common drinking cups. The base-

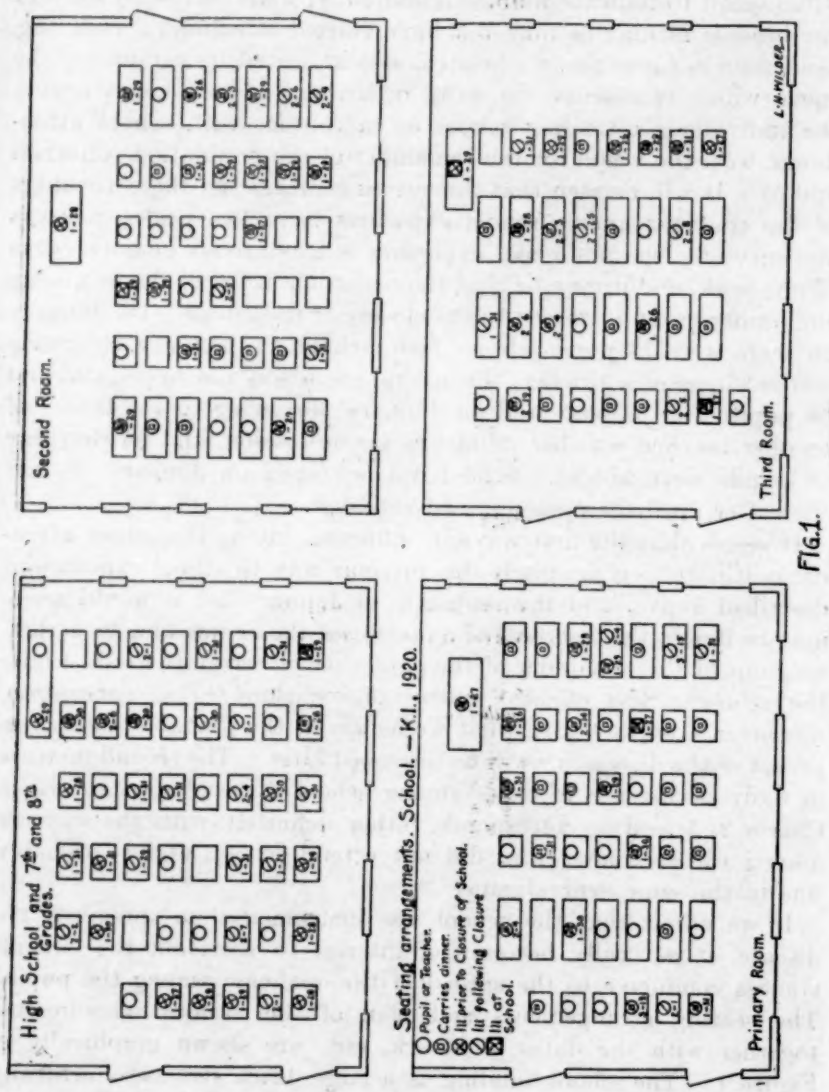


FIG. 1.

ment is also supplied with stationary wash bowls and bar soap. Paper towels are furnished. The school is supplied with open privies. A library is maintained, from which pupils may take books to their homes—a privilege more or less used by all classes. The

number of books exchanged in any one day, however, is not large, and in view of the rapid spread of the infection among the pupils, it is not felt that this is an important means among the possible agents of transmission.

A recess of about 10 minutes is permitted twice daily, and during this time there is free intermingling of the children, mostly in the open, however, weather permitting. The pupils who bring their dinners are not required to eat in their own seats, and they have a tendency to collect in groups about tables. No food is served at the school, no dishes are supplied, and the exchange of food is not common. There is, of course, abundant opportunity for "droplet infection," as well as more indirect methods of transferrence of saliva from person to person. The attack rates in the different schoolrooms were as follows:

	People.	Cases.	Per cent affected.
Primary room	42	18	42.8
Second room	37	20	54.1
Third room	33	18	54.5
High school	45	32	71.1

In studying the chronology of the epidemic among different occupational groups it was found that, with the exception of the school as above noted, the other occupations were affected practically synchronously, and it would seem, therefore, that these may be considered as subjected to about the same opportunities of infection.

TABLE V.—*Incidence of influenza in persons on Kelleys Island known to have attended social gatherings in January, 1920.*

Nature of party.	Date of party.	Number of school attendants present.	Cases of influenza in families of attendants on date of party.	Persons ill with influenza when at party.	Total persons present.	Number having influenza during epidemic.	Per cent ill.	Remarks.
Card party	Jan. 18	3	0	0	7	3	43	Lunch served.
School party	Jan. 20	15	0	0	18	12	67	Games and lunch.
Sleighing party	Jan. 24	2	0	0	16	11	69	Sleigh ride and supper.
Lodge meeting	Jan. 27	0	0	0	18	12	67	
Home party	Jan. 27	1	0	1	13	7	54	Games and lunch.
Birthday party	Jan. 28	0	0	0	16	8	50	Do.
Masquerade	Jan. 29	11	6	3	30	23	77	Dance, buffet lunch.
Total					118	76	64	

Other possible influences considered: Parties.—A number of parties were held upon the island just prior to and during the early part of the epidemic, as follows: January 18, 20, 24, 27, and 28. (See Table V.) It will be noted from Table V that these parties were

attended by from 7 to 30 people. It is difficult, however, to estimate the effect, if any, which these parties may have had in spreading the disease, owing to the fact that the number of people at any one party was small, the same people often attending several of them, and it is known that many persons in attendance had definite exposure to multiple possible sources of infection at school, in their own home, or elsewhere. The party held on January 29 deserves especial mention. This was a masquerade dance held in the village hall and attended by 30 persons. A buffet lunch with a beverage was served, the latter by means of individual paper cups. In attendance at this affair there were three people who were coming down with influenza and who were actually ill at the time. Six people were present, moreover, who had cases of influenza in their families at home. It would indeed seem probable that some cases might develop from such exposure, and the high attack rate in this group (76.8 per cent), notwithstanding the small number involved, may be significant. The school children in attendance were mainly from the high school, which had the highest incidence of any room in the school (71.1 per cent), and it may be that there is a relation between these two attack rates.

Milk as an agent of spread.—Fresh milk for the island is entirely a local product. The individual dairies are too small in most cases, however, to permit of separate study, hence we have grouped them for this purpose into those supplying a single household and those which produce an excess for sale to other families. It would seem that in the former group milk could not be a factor in introducing the infection into the home, although in the latter such a possibility might exist through the milk, returned containers, etc. Reference to the summary of this study, Table VI, shows, we believe, that milk was not a factor of importance in spreading the influenza at Kelleys Island. A study of the chronology in the different groups, moreover, leads to the same conclusion. (Table VII.) A further study of those families using milk from dairies which had influenza in the household failed to show significant variation either in attack rate or chronology when compared with users of milk from dairies having no ill attendants.

TABLE VI.—*Incidence of influenza in families receiving their milk supply from various sources, 1920.*

Milk supply.	Number of families.	Number of persons.	Number of cases.	Per cent attacked.
26 small dairies	107	487	254	52
One-family dairies	18	91	66	73
Condensed	7	19	11	58
Unknown	28	92	38	41
Total	160	689	369	54

TABLE VII.—*Daily incidence of influenza in persons obtaining milk from various sources, 1920.*

Supply.	November.	December.		January.														February.																					March.			Unknown.	Total.
		12	25	1	3	4	12	14	15	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	13	15	23		
Customers of 26 small dairies	1	1	1	1	...	2	2	2	2	...	1	4	1	16	13	21	34	18	19	29	21	19	11	6	4	2	5	4	...	4	3	...	1	...	1	1	.....	.....	2	1	1	1	1	254
Customers of one-family dairies	...	...	...	...	...	...	...	...	1	...	...	...	7	2	7	8	13	2	8	2	3	1	1	1	1	3	1	...	2	1	1	...	1	...	...	...	...	...	...	...	...	...	...	66
Persons using condensed milk	...	...	...	...	...	...	...	...	...	1	1	...	...	...	1	...	...	...	1	1	...	2	...	2	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11
Source of milk unknown	...	...	...	...	...	...	...	...	...	1	...	...	...	...	3	3	5	4	7	4	4	...	1	1	1	1	...	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	38

TABLE VIII.—*Incidence of influenza in families according to source of water supply, 1920.*

Source of water.	Number of families.	Number of people.	Number ill.	Per cent ill.
Lake	72	343	168	49
Rain	65	235	129	55
Lake and rain	21	101	68	67
Well	2	10	4	40
Total	160	689	369	53.5

Water as an agent of spread.—A summary showing the principal sources of water supply and the attack rate among users of each is given in Table VIII. Rain water is collected in family cisterns. No fresh water had been stored for over two months, owing to lack of rain. In many of the homes the supply of cistern water was low and was supplemented by water carried or hauled from Lake Erie. Others used raw lake water as their chief supply. Two drilled wells on the island supplied two families. No evidence incriminating any one of these sources as a carrier of influenza was found.

Insects.—Insects need not be considered, as the weather was too cold for them to be active.

Crowding.—The possible influence of crowding, as indicated by a consideration of the number of rooms per person in the various households, is shown in Table IX. In 1920 it will be noticed there is very little apparent relation between the number of rooms per person and the attack rate, whereas in 1918 there is a tendency for the attack rate to vary directly with the crowding. This question will be considered later.

Economic status.—There is not a wide range of economic conditions obtaining on the island; consequently this locality is not as suitable for studying this question as a region where the extremes of variation are more pronounced. The economic status was recorded entirely from the general appearances and conditions of the home. The results of this study are shown in Table X. It will be seen that in 1920 the attack rate was lowest in the lowest economic group, whereas in 1918 the reverse was the case.

Housing conditions.—A consideration of the attack rates among those living in poor, average, and good houses is shown in Table XI. It will be noticed that in 1920 the poorer houses were less visited by influenza, whereas in 1918 the reverse was the case.

TABLE IX.—*Incidence of influenza in relation to rooms per person in dwellings, 1918 and 1920.*

Number of families.	Rooms per person.	Number of persons.	Number of cases.		Average rooms per person.	Average bedrooms per person.	Per cent attacked.	
			1920	1918			1920	1918
55	1 and under.	337	177	82	0.79	0.377	52.5	24.3
59	Between 1 and 2.	247	137	39	1.37	.96	55.6	15.8
45	2+	165	58	15	2.43	.77	35.2	14.3

TABLE X.—*Incidence of influenza in relation to economic status of families, 1918 and 1920.*

Economic status.	Families.	Number of persons.	Number of cases.		Per cent attacked.	
			1920	1918	1920	1918
Poor	68	339	147	91	43.4	26.8
Average	45	174	110	27	63.3	15.5
Well-to-do	47	176	111	18	63.0	10.2

TABLE XI.—*Incidence of influenza in relation to housing conditions of families, 1918 and 1920.*

Housing conditions.	Families.	Number of persons.	Number of cases.		Per cent attacked.	
			1920	1918	1920	1918
Poor	40	193	66	57	34.2	29.5
Average	27	140	81	23	57.8	16.4
Good	93	356	221	56	62.1	15.7

TABLE XII.—*Incidence of influenza in relation to general sanitation in the homes, 1918 and 1920.*

General sanitation.	Families.	Number of persons.	Number of cases.		Per cent attacked.	
			1920	1918	1920	1918
Poor	39	291	117	94	39.8	32
Average	41	167	102	17	61.2	10.2
Good	60	228	149	25	65.3	10.9

General Sanitation.—A consideration of persons living under poor, average, and good general sanitation in their homes is shown in Table XII. It will be noticed that the apparent influence of this factor is also exerted in opposite directions in the two epidemics of 1918 and 1920, respectively. Generally, it may be said that those persons whom we usually consider the more fortunately situated suffered relatively more severely in the 1920 epidemic than did their poorer

neighbors, whereas in the 1918 epidemic the reverse held true. This matter will be referred to again when we consider more fully the 1918 epidemic.

INCUBATION PERIOD.

If we are correct in assuming that the first case of influenza in a household is often the source of infection for subsequent cases, it would seem that a consideration of the interval between first and subsequent cases might serve as a rough index of the incubation period. The number of cases available for this consideration is small, but we believe the information relative to them is accurate. In this study, when two cases occur on the first day of illness for that household, one is not considered subsequent to the other where a common source of infection is known. A curve of frequency giving the occurrence of subsequent cases after first cases, by interval in days, is given in Chart 6. The cases occurred as follows:

Interval, in days:	Cases.
Less than 1	3
1	42
2	57
3	37
4	40
5	17
6	13
7	3

There were found, moreover, 27 cases where a known definite exposure was followed by an attack of influenza. These cases are summarized in Table XIII. It will be noted that in some of these cases the time of exposure extended over a day or more; hence the only determination of the incubation period possible in these cases is to define it within certain limits. Considering the introduction of the infecting agent to date from the first exposure, however, since the 27 persons were evidently susceptible, we have the following:

Incubation period, in days:	Cases.
1	9
2	6
3	8
4	4

CHART 6: INFLUENZA (IN FAMILIES WITH MORE THAN ONE CASE), KELLEYS ISLAND, 1920.

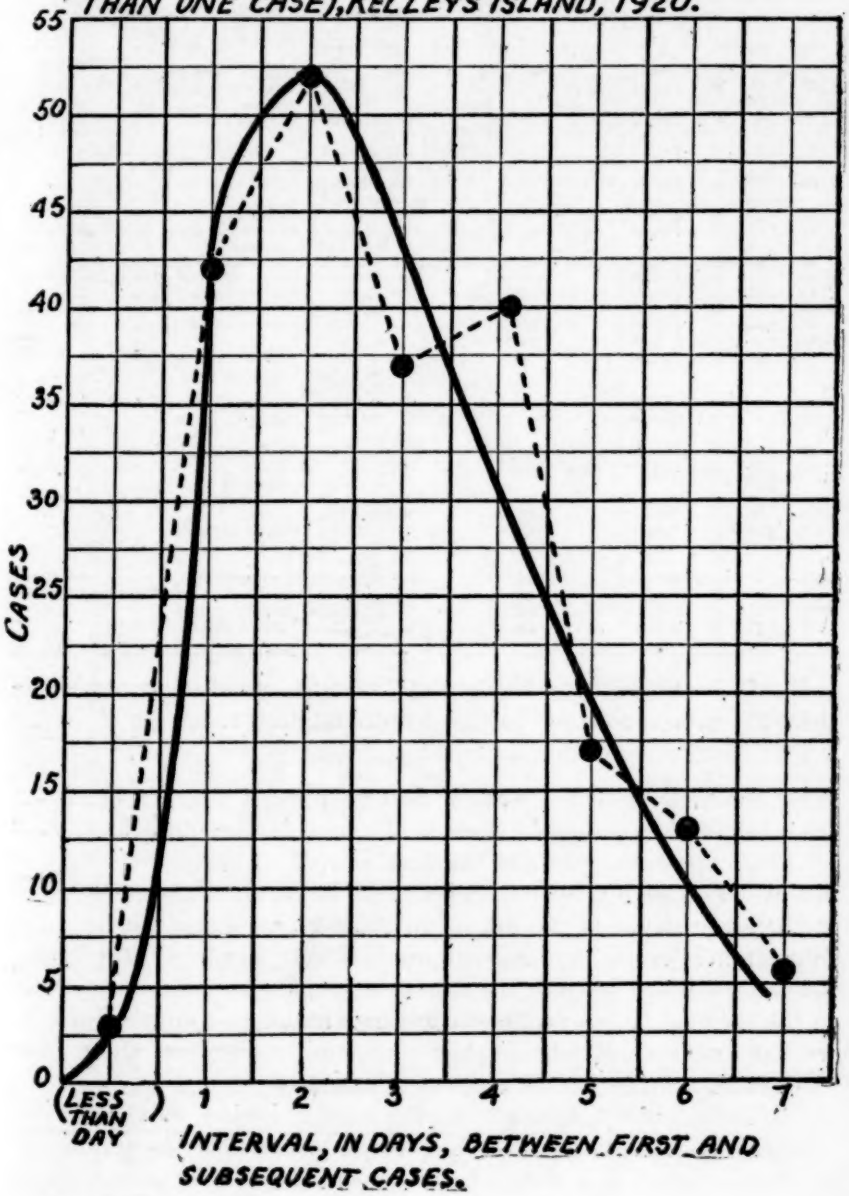


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TABLE XIII.—*Summary of 27 known contacts followed by influenza, Kelleys Island, 1920.*

Home No.	Age.	Sex.	Date of exposure.		Date of onset.	Interval in days.	Day of illness of the case to which exposed.	Nature of contact.
			From—	To—				
2	46	F.	Jan. 28	.....	Feb. 1	4	1st.....	Visiting cases.
20	42	M.	Jan. 28	Jan. 29	Jan. 31	2-3	1st.....	Associated with ill persons at a dance.
21	66	F.	Feb. 2	.....	Feb. 4	2	2d, 3d, and 4th.	Visiting cases.
33	21	M.	Feb. 1	.....	Feb. 2	1	1st, 2d, and 5th.	Do.
36	70	F.	Jan. 31	Feb. 3	Feb. 3	0-3	1st, 2d, and 3d.	Caring for cases.
37	28	M.	Feb. 2	.....	Feb. 3	1	2d.....	Visiting cases.
41	24	F.	Jan. 29	.....	Jan. 31	2	1st.....	Associated with ill persons at a dance.
42	26	F.	Jan. 29	.....	Jan. 30	1	1st.....	Gave violin lessons to ill boy.
43	84	F.	Jan. 29	.....	Jan. 30	1	1st.....	Kissed and visited with ill nephew.
44	54	M.	Jan. 27	Jan. 29	Jan. 29	0-2	1st.....	Visiting cases.
45	19	M.	Jan. 29	.....	Feb. 2	4	1st and 2d...	Do.
46	22	F.	Jan. 29	.....	Feb. 1	3	1st.....	Associated with ill at a dance.
48	56	F.	Jan. 29	.....	Jan. 31	2	1st.....	Do.
51	36	M.	Jan. 31	Feb. 2	Feb. 3	1-3	1st.....	Visiting and caring for cases.
56	58	F.	Feb. 4	.....	Feb. 7	3	1st, 2d, and 3d.	Caring for cases.
76	34	M.	Jan. 29	.....	Feb. 1	3	1st and 2d...	Visiting cases.
79	52	F.	Jan. 30	.....	Jan. 31	1	1st, 2d, and 3d.	Caring for cases.
81	35	F.	Jan. 24	.....	Jan. 27	3	.....	Visiting cases.
82	34	M.	Jan. 18	Jan. 29	Jan. 31	2-3	1st.....	Visited and had refreshments at home of ill.
101	28	F.	Feb. 2	.....	Feb. 3	1	1st.....	Visited cases.
104	60	F.	Feb. 5	.....	Feb. 7	2	6th and 7th .	Do.
121	24	F.	Jan. 30	Feb. 1	Feb. 3	2-4	1st and 2d...	Caring for cases.
147	35	F.	Jan. 30	Feb. 3	Feb. 3	0-4	1st, 2d, 3d, and 4th.	Do.
152	37	F.	Feb. 3	.....	Feb. 4	1	1st, 2d, and 3d	Visiting cases.
154	24	F.	Jan. 31	Feb. 1	Feb. 2	0-1	1st.....	Husband returned from mainland ill.
156	25	M.	Feb. 14	Feb. 16	Feb. 16	0-2	1st, 2d, and 3d	Caring for cases.
160	43	F.	Feb. 2	.....	Feb. 3	1	2d.....	Visiting cases.

It will be noted from Table XIII that the incubation periods in these 27 cases appear to bear no definite relation to age.

PERIOD OF INFECTIVITY.

By referring to Table XIII it will be noticed that 12 of the 27 cases followed exposure to cases in the first day of illness only, and 10 were exposed to cases in the first as well as subsequent days of illness. This high proportion of attacks following exposure to cases in the early stages of the disease in these 27 cases can not be taken to mean necessarily that cases are more infectious early in the illness, for cases exposed later in the disease are apt more often to be later in the epidemic when multiple exposures are more common; and, as we have no way of telling which exposure is effective, these cases can not be utilized for the purpose of this table.

The spread of the epidemic among school children would indicate similarly the infectivity of early cases. A survey of the pupils and teachers showed that definitely ill persons actually attended school as follows: January 27, two; January 28, one; January 29, three. (See Fig. 1.) No ill persons attended school for more than one day of definite illness. These cases, together with those of gradual onset who may have attended school in the early stages of influenza, but

who were not then feeling definitely ill, may account for the spread in the schools without assuming the existence of well carriers, which, however, may exist; and several early cases were found which rather suggest this possibility. Numerous examples, however, were found of people mildly ill or in the first stages of an attack, attending school, parties, church, etc., and it is probable that such cases are important agents of spread whenever an outbreak of influenza occurs.

Exposure.—In the 27 cases where the illness followed a single definite known exposure, the character of the contact is given in Table XIII. It will be noted that—

13 cases followed the visiting of ill friends;
8 cases followed the nursing of ill friends;
4 cases followed exposure to ill friends at a dance;
1 case followed the giving of a violin lesson to an ill pupil; and
1 case followed kissing and visiting with ill nephew.

The 1918 Epidemic.

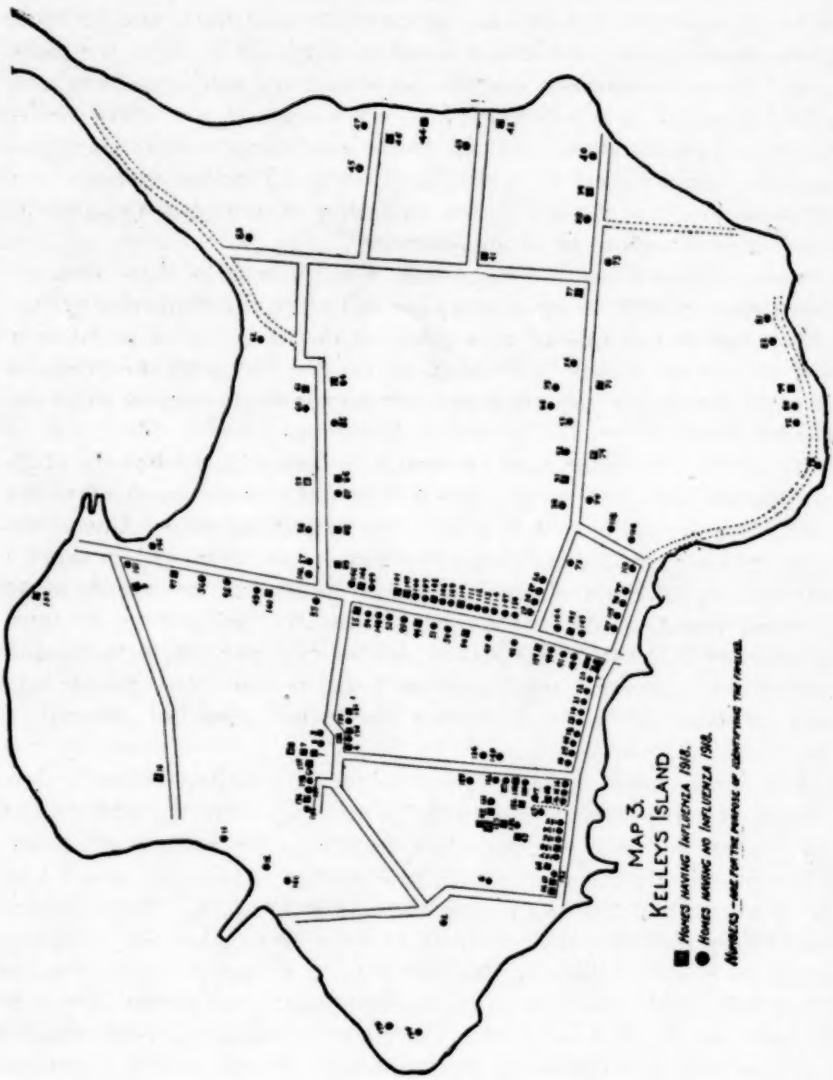
The epidemic of 1918 found the island with a somewhat larger population than it had during the 1920 epidemic, as the quarries were running at capacity in order to meet the urgent calls for limestone for use in the steel industries. Navigation was open, and not only were cargo vessels calling at the island, but a regular passenger schedule was maintained by gasoline launch to Sandusky, and a tourists' boat, the *Arrow*, stopped at the island twice daily on its trips from Sandusky and Lakeside to Put-in-Bay; also, private launches made trips in good weather; consequently the shore communication was better than was found during the winter of 1920. Of the 689 persons found on the island in 1920 there were 136 who stated they had had influenza in 1918. (See Table XIV.) Nine of these people were on the mainland at the time; hence, 127 among 680 persons were affected in 1918, or an attack rate of 18.7 per cent, compared with an attack rate of 53.4 per cent in 1920.

TABLE XIV.—*Sex and age distribution of cases of influenza on Kelleys Island, 1918.*

Age (years).	Population.			Cases.			Attack rate, per cent.		
	Male.	Female.	Both sexes.	Male.	Female.	Both sexes.	Male.	Female.	Both sexes.
Under 1	9	4	13	0	0	0	0	0	0
1–4	42	36	78	7	3	10	17	8	13
5–9	39	40	79	10	7	17	26	17	22
10–14	36	43	79	11	12	23	31	28	29
15–19	27	24	51	6	6	12	22	25	24
20–24	16	27	43	3	8	11	19	30	26
25–29	25	23	48	10	5	15	40	22	31
30–34	28	27	55	4	3	7	14	11	13
35–39	17	20	37	5	5	10	30	25	27
40–44	21	16	37	6	2	8	29	12	22
45–49	22	17	39	5	5	10	23	30	26
50–54	22	16	38	2	1	3	9	6	8
55–59	21	13	34	1	5	6	5	38	18
60–64	10	6	16	3	0	3	30	0	19
65–69	12	9	21	0	1	1	0	11	5
70 and over	10	11	21	0	0	0	0	0	0
Total	357	332	689	73	63	136	20.4	19.0	19.7

Influences in spread and repressive measures employed.—Upon the appearance of the epidemic in 1918, about October 15, the local authorities applied strict measures aimed to check its spread. Schools and churches were promptly closed, and all public gatherings, parties, dances, public weddings, etc., were prohibited by ordinance. The post office was closed during distribution of mail, and when the doors were opened only two or three people were allowed to enter at one time. Soda fountains were forced to suspend operations, and the saloon, although permitted to remain open, was compelled to remove all chairs from the lobby and to allow no groups to congregate. People were warned of the danger of visiting the mainland. The ill were quarantined in their homes, as were the remainder of the family. The conditions on the island, moreover, were ideal for the enforcement of these measures; the territory was limited and isolated, and the inhabitants were well known to each other and to the authorities. From a wide inquiry that was made, it would seem that these measures at that time met with popular approval and were well observed. It will be noticed that these repressive measures contain no provisions likely to influence the spread of the disease within the household when once the infection had gained admittance, and when the people of the affected families during 1918 are considered, it is found that they had an attack rate of 53 per cent against an attack rate of 71.5 per cent for the inhabitants of homes where infection occurred in 1920. It is probable, however, that the figure representing the attack rate in this group for 1918 is too low; for our data do not enable us to eliminate the persons who may have absented themselves from the homes in 1918 when illness appeared in the household; neither have we excluded from the 1920 rate those mild doubtful cases which might even be forgotten after 15 months. It seems possible, then, that the virulence of the organism in the two epidemics may have been rather comparable, and that the measures of suppression may have been partially effective on the island. For distribution of cases in 1918 see Map 3.

Other influences.—As noted above, the people who lived under poor housing conditions, those of lower economic status and of poorer general home sanitation, were affected to a greater degree in the 1918 epidemic than were the more fortunately located individuals. (See Charts X, XI, and XII.) It will be noted from the charts that these people had a higher average number of persons in the households than did the more fortunate families of each group, and it would seem that there would thus be more opportunities for infection to be introduced into the household than would be the case in smaller families. This factor might be expected to have its influence, in addition to those of housing, sanitation, etc., provided that the general spread of the epidemic was checked before it had run its course


MAP 3.
KELLEYS ISLAND
HOUSES HAVING INFLUENZA 1918.
HOUSES HAVING NO INFLUENZA 1918.
NUMBERS ARE FOR THE PURPOSE OF IDENTIFYING THE FAMILIES.

through the exhaustion of the reservoir of susceptible individuals, as seems to have been the case in 1918. Again, if there be an immunity following attack, it may be that the higher attack rate in the poor, the insanitary, etc., in 1918, may be related to the lower attack rate in 1920. It would seem, however, that this is not the only factor of importance, since a consideration of the attack rates for 1920 in the families where no illness occurred in 1918 still shows the well-to-do, the better housed, and the more sanitary homes to have had a higher attack rate in 1920. In these studies of the home conditions we have assumed that the living conditions in 1918 were the same as those found in 1920; and although minor changes are probable in a few cases, it is felt that they do not alter the general conditions enough to be of importance.

Immunity.—Of the 136 cases who were ill in 1918 there were 27 reattacked in 1920, or an attack rate of 19.8 per cent for this group, against an attack rate of 62.4 per cent in the group of population not affected in 1918, a fact which, we believe, indicates the presence of a relative though not absolute immunity some 15 months following the infection.

That this conclusion may be correct is indicated by a study of 25 families in which 56 cases developed in 1918 and in each of which one or more members became ill in 1920, thus rendering it probable that the occupants of the respective homes were more or less equally exposed to infection during the latter epidemic. Among these 56 persons from these 25 families, who were attacked in 1918, 27 were reattacked in 1920, or an attack rate of 48.2 per cent as compared with a 100 per cent attack rate in 1918; whereas the attack rate during the 1920 epidemic among the 66 members not affected in 1918 was 77.2 per cent.

Certain surveys made in Maryland by the United States Public Health Service in 1918 and 1919 (results unpublished), and studies by Jordan and Sharp (Journal of Infectious Diseases, May, 1920), show practically the same attack rate in 1920 among the people who were affected in 1918 as among those who escaped. While Jordan and Sharp interpret their findings as pointing to a lack of immunity some 15 months following the 1918 attack, it appears to the writers that this conclusion is not necessarily correct; for in the Maryland studies and in those of Jordan and Sharp it seems probable that at the conclusion of the severe 1918 epidemic a high percentage of the relatively susceptible individuals from the people studied had been affected, or, in other words, the unattacked represent a group of people who were for some reason relatively immune. Consequently, in comparing the influenza incidence for 1920 among the people who were attacked, with that among those who were not attacked in 1918,

they are comparing the attack rate of two groups, one of which was 100 per cent susceptible in 1918, since all had the disease—that is, barring mistakes of diagnosis—against another group including presumably a certain proportion of relatively immune individuals, and find the immunity of the first group, as measured by rate of attack, to be raised practically to that of the second group after a period of 15 months. At Kelleys Island, however, as above noted, it seems that the 1918 epidemic for some reason, probably due to the natural isolation and to the repressive measures taken, failed to exhaust the supply of susceptible individuals, thus leaving us a more satisfactory group for comparison.

That the group which escapes infection following exposure to influenza is composed of relatively more immune people, is indicated by a consideration of the 50 island households, in each of which one or more cases developed in 1918, and the 110 families in which no cases occurred during that epidemic. In 1918 the 50 households developed 127 cases, leaving 112 nonaffected members. The 110 households which developed no cases in 1918 comprised 441 individuals. During the 1920 outbreak the 112 much-exposed and non-attacked persons of the 1918 epidemic developed 52 cases—an attack rate of 46.4 per cent—whereas the 441 persons not ill and less exposed in the 1918 outbreak furnished 290 cases in 1920, or an attack rate of 65.7 per cent.

Summary.

1. The public school, which remained in session without medical supervision of any kind during the early portion of the 1920 epidemic, served as a center for the spread of influenza upon the island. We do not mean to infer that prompt closure of this school would have prevented the 1920 epidemic, but it does seem probable that it would have delayed it.

2. It seems probable that the measures of suppression as applied during the epidemic of 1918 were partially successful at Kelleys Island, where it must be admitted conditions were rather ideal for such procedure.

3. Milk and water had no apparent relation to the spread of influenza upon the island in 1920.

4. The apparent influence of crowding, housing conditions, economic status, and general sanitation seems to have been exerted in an opposite direction during the two epidemics (1918 and 1920).

5. The incubation period most frequently observed appears to have been from one to four days.

6. A relative immunity seems to be apparent 15 months following the 1918 epidemic.

ACKNOWLEDGMENT.

The authors wish to express their appreciation to State Health Commissioner A. W. Freeman for his assistance in the selection of a suitable place for making these studies.

COURT DECISIONS.

COURT REFUSES TO ENJOIN ERECTION OF TUBERCULOSIS HOSPITAL.[1]

The Supreme Judicial Court of Massachusetts has recently refused to enjoin the erection of a tuberculosis hospital as a nuisance.

Under the law it was the duty of the city of Fall River to establish and maintain within its limits a tuberculosis hospital. A site was selected and this site was approved by both the local board of health and the State department of health.

The plaintiffs resided in the vicinity of the proposed new hospital and sought to enjoin its erection on the ground that it would constitute a nuisance. The court, however, decided adversely to them and refused to issue an injunction. The following is quoted from the opinion:

> Hospitals for contagious diseases must be established and maintained for the protection of the general public; and it is not to be assumed in advance that such a hospital, well equipped and managed under the supervision of public health boards, will be a nuisance. * * *
>
> Without going so far as to say that purely mental discomfort can not constitute a nuisance, certainly the law will not enjoin the erection of a municipal hospital on facts such as are disclosed by this record, in order to protect the plaintiffs from dangers which are found to be unreal. * * * Depreciation of the market value of the petitioners' land, assuming it to be proved, would not be decisive in their favor. * * * In Everett *v.* Paschall, 61 Wash., 47; 111 Pac., 879; 31 L. R. A. (N. S.) 827; Ann. Cas., 1912B, 1128, relied on by the petitioners, the defendant maintained in his cottage, adjoining the lots of the plaintiffs, a private sanatorium for the treatment of tuberculosis patients; and the injunction was granted partly at least under the influence of a statute of that State which broadened the definition of nuisance. There is nothing in that case, nor in Cherry *v.* Williams, 147 N. C., 452; 61 S. E., 267; 125 Am. St. Rep., 566; 15 Ann. Cas., 715, to support a claim that a public hospital for the treatment of tuberculosis is a nuisance *per se*. In view of the findings of the master we should have to go substantially to this extreme in order to say that the trial judge was not warranted in dismissing the bill for an injunction. * * *

ADMISSION OF UNVACCINATED CHILDREN TO SCHOOL.[2]

A decision concerning the attendance at school of unvaccinated children has recently been rendered by the Supreme Judicial Court of Massachusetts.

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[1] Cook et al. *v.* City of Fall River, 131 N. E., 346.

[2] Spofford *v.* Carlton et al., 131 N. E., 314.

The statutes of that State require the vaccination of children before they can be admitted to the public schools, but an exception is made in the case of a child who presents a physician's certificate that such child is an unfit subject for vaccination. A regulation adopted by the school committee of the city of Haverhill required that such physician's certificate of exemption be renewed every two months.

The children of the petitioner in this case were excluded from school because they were not vaccinated and did not comply with the school committee's regulation requiring the renewal of a physician's certificate. A writ of mandamus to compel the respondents, the school committee, to admit the children to school was petitioned for, but the court dismissed the petition. In its opinion the court stated as follows:

* * * The intention of the legislature is clear that the exemption is not to cover absolutely the entire period of the child's attendance, but the certificate is limited to the period when his physical condition is such that in the opinion of the certifying physician he is an unfit subject for vaccination. * * * The regulation is not as matter of law so unreasonable or arbitrary as to be invalid, nor is it discriminatory. * * *

DEATHS DURING WEEK ENDED JULY 9, 1921.

Summary of information received by telegraph from industrial insurance companies for week ended July 9, 1921, and corresponding week, 1920. (From the "Weekly Health Index," July 12, 1921, issued by the Bureau of the Census, Department of Commerce.)

	Week ended July 9, 1921.	Corresponding week, 1920.
Policies in force	46,741,826	44,307,593
Number of death claims	6,531	7,006
Death claims per 1,000 policies in force	7.3	8.2

Deaths from all causes in certain large cities of the United States during the week ended July 9, 1921, infant mortality, annual death rate, and comparison with corresponding week of preceding years. (From the "Weekly Health Index," July 12, 1921, issued by the Bureau of the Census, Department of Commerce.)

City.	Estimated population, July 1, 1921.	Week ended July 9, 1921.		Average annual death rate per 1,000.[2]			Deaths under 1 year.			Infant mortality rate, week ended July 9, 1921.[3]
		Total deaths.	Death rate.[1]				Week ended July 9, 1921.		Previous year or years.[2]	
Akron, Ohio	229,195	42	9.6		[4]7.2		4		[4]4	38
Albany, N. Y	115,071	37	16.8	C	18.8		4	C	4	90
Atlanta, Ga	207,473	60	15.1	C	18.2		18	C	15	.....
Baltimore, Md	752,863	181	12.5	A	14.1		35	A	37	98
Birmingham, Ala	186,133	68	19.0	A	23.4		13	A	11	.....
Boston, Mass	757,634	149	10.3	A	14.0		25	A	30	67
Bridgeport, Conn	149,967	28	9.7	A	16.8		4	A	8	50
Buffalo, N. Y	519,608	114	11.4	C	10.3		16	C	18	62
Cambridge, Mass	110,444	22	10.4	A	10.2		4	A	4	72
Camden, N. J	119,672	36	15.7	.....			13	.....		194
Chicago, Ill	2,780,655	597	11.2	A	12.6		107	A	105	.....
Cincinnati, Ohio	403,418	118	15.3	C	15.4		8	C	9	53
Cleveland, Ohio	831,138	170	10.7	C	9.5		24	C	23	64
Columbus, Ohio	245,358	66	14.0	C	12.8		5	C	8	58
Dallas, Tex	165,282	40	12.6	A	14.4		7	A	4	.....
Dayton, Ohio	158,119	52	17.1	C	6.1		5	C	1	82
Denver, Colo	263,152	64	12.7	A	12.3		7	.....		.....
Detroit, Mich	1,070,450	220	10.7	C	9.7		57	C	41	108
Fall River, Mass	120,668	24	10.4	C	10.8		4	C	5	60
Grand Rapids, Mich	141,197	38	14.0	C	13.9		7	C	8	118
Houston, Tex	144,340	24	8.7	.....			3	.....		.....
Indianapolis, Ind	325,215	64	10.3	C	13.1		11	C	12	85
Jersey City, N. J	302,788	70	12.1	C	9.6		17	C	19	117
Kansas City, Kans	103,884	20	10.0	C	10.7		4	C	4	95
Kansas City, Mo	336,157	102	15.8	C	10.6		15	C	7	.....
Los Angeles, Calif	611,921	132	11.2	A	12.0		20	A	11	94
Louisville, Ky	236,083	90	19.9	C	15.5		19	C	4	219
Lowell, Mass	113,757	20	9.2	A	14.7		3	A	8	48
Memphis, Tenn	165,389	59	18.6	C	17.2		11	C	9	.....
Milwaukee, Wis	468,386	94	10.5	A	11.6		20	A	14	97
Minneapolis, Minn	392,815	72	9.6	C	10.2		6	C	12	34
Nashville, Tenn	122,036	44	18.8	C	22.4		4	C	4	.....
New Bedford, Mass	125,012	17	7.1	A	14.7		4	A	8	61
New Haven, Conn	167,007	27	8.4	C	9.9		5	C	2	60
New Orleans, La	394,657	122	16.1	A	17.9		14	A	13	.....
New York, N. Y	5,751,867	1,069	9.7	C	9.5		158	C	151	62
Newark, N. J	424,885	69	8.5	C	11.0		12	C	16	53
Norfolk, Va	121,260	35	15.1	.....			8	.....		142
Oakland, Calif	226,472	38	8.7	A	9.3		2	A	3	25
Omaha, Nebr	197,066	39	10.3	.....			3	.....		35
Paterson, N. J	137,463	21	8.0	.....			4	.....		68
Philadelphia, Pa	1,866,212	411	11.5		[4]11.8		56		[4]63	67
Pittsburgh, Pa	602,452	179	15.5	C	12.7		32	C	32	114
Portland, Oreg	264,859	56	11.0	C	12.0		4	C	9	40
Providence, R. I	239,645	35	7.6	C	12.3		7	C	8	57
Richmond, Va	175,686	53	15.7	C	16.9		10	C	12	122
Rochester, N. Y	305,229	57	9.7	C	8.4		6	C	3	47
St. Louis, Mo	786,164	169	11.2	C	11.5		19	C	23	.....
St. Paul, Minn	237,781	47	10.3	C	9.1		6	C	5	60
Salt Lake City, Utah	121,595	32	13.7	A	11.8		8	.....		124
San Francisco, Calif	520,546	103	10.3	C	12.2		4	C	10	23
Seattle, Wash	327,227	66	10.5	A	7.6		8	A	4	67
Spokane, Wash	104,442	16	8.0	C	17.0		1	C	9	22
Springfield, Mass	135,877	26	10.0	C	11.5		4	C	6	60
Syracuse, N. Y	177,265	31	9.1	C	18.6		7	C	10	84
Toledo, Ohio	253,696	46	9.5	A	13.7		5	A	6	50
Trenton, N. J	122,760	24	10.2	A	16.8		5	A	9	76
Washington, D. C	454,026	126	14.5	A	13.8		14	A	12	82
Wilmington, Del	113,408	25	11.5	C	9.8		4	.....		.....
Worcester, Mass	184,972	54	15.2	C	6.3		12	C	3	129
Yonkers, N. Y	103,324	16	8.1	A	11.5		3	A	4	68
Youngstown, Ohio	139,432	42	15.7	C	11.2		13	C	6	165

[1] Annual rate per 1,000 population.

[2] "A" indicates data for the corresponding week of the years 1913 to 1917, inclusive. "C" indicates data for the corresponding week of the year 1920.

[3] Deaths under 1 year per 1,000 births—an annual rate based on deaths under 1 year for the week and estimated births for 1920. Cities left blank are not in the registration area for births.

[4] Data based on statistics of 1915, 1916, and 1917.

PREVALENCE OF DISEASE.

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring.

UNITED STATES.

CURRENT STATE SUMMARIES.

Telegraphic Reports for Week Ended July 16, 1921.

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

ALABAMA.

	Cases.
Chicken pox	4
Diphtheria	16
Dysentery	1
Hookworm	76
Malaria	18
Measles	12
Mumps	6
Ophthalmia neonatorum	1
Pellagra	4
Pneumonia	2
Scarlet fever	16
Smallpox	22
Tuberculosis	28
Typhoid fever	52
Whooping cough	16

ARKANSAS.

Cerebrospinal meningitis	1
Chicken pox	5
Diphtheria	4
Malaria	152
Measles	5
Pellagra	23
Scarlet fever	2
Smallpox	6
Tuberculosis	9
Typhoid fever	25
Whooping cough	13

CALIFORNIA.

Botulism—Riverside County	1
Cerebrospinal meningitis:	
Los Angeles	1
San Bernardino	1
San Jose	1
Lethargic encephalitis:	
San Francisco	2
Ontario	1

CALIFORNIA—continued.

	Cases.
Poliomyelitis:	
San Francisco	2
San Jose	1
Smallpox	36
Typhoid fever	17

COLORADO.

(Exclusive of Denver.)

Anthrax	1
Chicken pox	2
Diphtheria	32
Measles	31
Mumps	1
Scarlet fever	10
Smallpox	19
Tuberculosis	8
Typhoid fever	6
Vincent's angina	1
Whooping cough	3

CONNECTICUT.

Cerebrospinal meningitis	5
Chicken pox	19
Diphtheria	35
Dysentery (bacillary)	2
Influenza	1
Lethargic encephalitis	1
Malaria	2
Measles:	
Hartford	9
Willimantic	8
Scattering	17
Mumps	17
Pneumonia (lobar)	11
Poliomyelitis	2
Scarlet fever	25
Tetanus	5
Trachoma	1

CONNECTICUT—continued.

	Cases.
Tuberculosis (all forms)	56
Typhoid fever:	
Hartford	8
Scattering	10
Whooping cough	53

DELAWARE.

Diphtheria	3
Measles	1
Scarlet fever	5
Tuberculosis:	
Wilmington	15
Woodside	1
Typhoid fever	3
Whooping cough	14

FLORIDA.

Diphtheria	11
Influenza	8
Malaria	17
Measles	7
Pneumonia	17
Smallpox	4
Typhoid fever	19

GEORGIA.

Cerebrospinal meningitis	1
Chicken pox	18
Diphtheria	16
Dysentery (amebic)	1
Dysentery (bacillary)	9
German measles	2
Hookworm	13
Influenza	5
Malaria	47
Measles	2
Mumps	1
Paratyphoid fever	9
Pellagra	2
Scarlet fever	7
Septic sore throat	4
Smallpox	10
Tuberculosis (pulmonary)	8
Typhoid fever	51
Whooping cough	3

ILLINOIS.

Cerebrospinal meningitis:	
Chicago	2
Ogle County—Grand Detour Township	1
Table Grove	1
Diphtheria:	
Chicago	80
Scattering	23
Influenza	2
Pneumonia	62
Poliomyelitis:	
Area	1
Chicago	2
East St. Louis	1
Highland Park	1
Jacksonville	1
Kewanee	1
La Salle County—Mendota Township	1
Logan County—Elkhart Township	1

ILLINOIS—continued.

	Cases.
Poliomyelitis—Continued.	
Morgan County—Waverly Precinct	1
Springfield	1
Tallula	1
Vermilion County—Jamaica Township	1
Wyanet	2
Scarlet fever:	
Chicago	16
Scattering	23
Smallpox	5
Typhoid fever	33

INDIANA.

Cerebrospinal meningitis—St. Joseph County	1
Diphtheria	32
Rabies in animals—Vigo County	1
Scarlet fever	16
Smallpox	9
Typhoid fever	25

IOWA.

Diphtheria	21
Poliomyelitis:	
Mason City	2
Rhodes	1
Scarlet fever	35
Smallpox	26

KANSAS.

Cerebrospinal meningitis	1
Chicken pox	8
Diphtheria	22
German measles	1
Influenza	1
Measles	12
Mumps	2
Pneumonia	1
Poliomyelitis	2
Scarlet fever	41
Smallpox	27
Tetanus	1
Trachoma	3
Tuberculosis	68
Typhoid fever	48
Whooping cough	57

LOUISIANA.

Anthrax	3
Cerebrospinal meningitis	1
Diphtheria	19
Smallpox	12
Typhoid fever	36

MAINE.

Cerebrospinal meningitis	1
Chicken pox	8
Diphtheria	19
Malaria	2
Measles	15
Poliomyelitis	1
Scarlet fever	13
Tetanus	1
Tuberculosis	3
Typhoid fever	7
Whooping cough	18

MARYLAND.[1]

	Cases.
Cerebrospinal meningitis	1
Chicken pox	11
Diphtheria	12
Dysentery	23
Influenza	1
Malaria	8
Measles	38
Mumps	9
Ophthalmia neonatorum	2
Pneumonia (all forms)	26
Poliomyelitis	4
Scarlet fever	9
Smallpox	2
Tuberculosis	53
Typhoid fever	37
Whooping cough	95

MASSACHUSETTS.

Cerebrospinal meningitis	4
Chicken pox	50
Conjunctivitis (suppurative)	17
Diphtheria	91
German measles	5
Lethargic encephalitis	1
Malaria	4
Measles	221
Mumps	43
Ophthalmia neonatorum	20
Pneumonia (lobar)	22
Poliomyelitis	6
Scarlet fever	65
Septic sore throat	2
Trachoma	1
Tuberculosis (all forms)	166
Typhoid fever	7
Whooping cough	87

MINNESOTA.

Cerebrospinal meningitis	1
Chicken pox	7
Diphtheria	35
Measles	23
Poliomyelitis	3
Scarlet fever	30
Smallpox	33
Tuberculosis	86
Typhoid fever	18
Whooping cough	6

MISSISSIPPI.

Diphtheria	15
Scarlet fever	1
Smallpox	6
Typhoid fever	38

MISSOURI.

Cerebrospinal meningitis	2
Chicken pox	6
Diphtheria	20
Epidemic sore throat	3
Measles	8
Mumps	4
Ophthalmia neonatorum	5
Poliomyelitis	8

MISSOURI—continued.

	Cases.
Scarlet fever	15
Smallpox	12
Tetanus	2
Trachoma	3
Tuberculosis	33
Typhoid fever	26
Whooping cough	83

MONTANA.

Rocky Mountain spotted or tick fever:	
Hamilton	2
Smallpox	13
Typhoid fever	4

NEBRASKA.

Chicken pox	3
Diphtheria	12
Measles	6
Mumps	1
Poliomyelitis—Omaha	1
Scarlet fever:	
Omaha	10
Scattering	13
Smallpox:	
Fremont	8
Scattering	15
Tuberculosis	2
Typhoid fever	3
Whooping cough	15

NEW JERSEY.

Cerebrospinal meningitis	1
Chicken pox	39
Diphtheria	79
Malaria	2
Measles	122
Pneumonia	25
Poliomyelitis	3
Scarlet fever	56
Smallpox	1
Typhoid fever	16
Whooping cough	198

NEW MEXICO.

Chicken pox	1
Diphtheria	15
German measles	1
Measles	2
Mumps	1
Paratyphoid fever	2
Pneumonia	1
Scarlet fever	1
Septic sore throat	1
Tuberculosis	39
Typhoid fever	10
Whooping cough	10

NEW YORK.

(Exclusive of New York City.)

Diphtheria	76
Influenza	1
Lethargic encephalitis	2
Measles	293

[1] Week ended Friday.

NEW YORK—continued.

	Cases.
Pneumonia	39
Poliomyelitis:	
Buffalo	1
New Rochelle	1
Rotterdam	1
Schenectady	1
Scarlet fever	98
Smallpox	11
Typhoid fever	22
Whooping cough	289

NORTH CAROLINA.

Chicken pox	5
Diphtheria	22
Measles	39
Poliomyelitis	1
Scarlet fever	15
Smallpox	17
Typhoid fever	123
Whooping cough	200

SOUTH DAKOTA.

Diphtheria	5
Measles	14
Pneumonia	2
Poliomyelitis	3
Scarlet fever	3
Smallpox	18
Tuberculosis	2
Typhoid fever	1
Whooping cough	3

TEXAS.

Chicken pox	7
Diphtheria	12
Measles	55
Mumps	9
Typhoid fever	13
Whooping cough	27

VERMONT.

Chicken pox	27
Diphtheria	3
Measles	60
Mumps	8
Pneumonia	1
Poliomyelitis	1
Scarlet fever	8

VERMONT—continued.

	Cases.
Typhoid fever	1
Whooping cough	38

VIRGINIA.

Poliomyelitis:	
Augusta County	1
Chesterfield County	1

WASHINGTON.

Chicken pox	15
Diphtheria	16
Measles	40
Mumps	6
Scarlet fever	12
Smallpox	39
Tuberculosis	13
Typhoid fever	5
Whooping cough	55

WEST VIRGINIA.

Chicken pox	2
Diphtheria	5
Measles	2
Scarlet fever	4
Smallpox	3
Typhoid fever	14

WISCONSIN.

Milwaukee:	
Cerebrospinal meningitis	1
Chicken pox	14
Diphtheria	17
German measles	1
Measles	5
Poliomyelitis	1
Scarlet fever	3
Smallpox	3
Tuberculosis	20
Typhoid fever	2
Whooping cough	32
Scattering:	
Cerebrospinal meningitis	2
Chicken pox	20
Diphtheria	28
German measles	2
Measles	32
Poliomyelitis	8
Scarlet fever	38
Smallpox	26
Tuberculosis	15
Whooping cough	80

Reports for Week Ended July 9, 1921.

DISTRICT OF COLUMBIA.

	Cases.
Cerebrospinal meningitis	1
Chicken pox	5
Diphtheria	3
Influenza	1
Lethargic encephalitis	1
Measles	34
Poliomyelitis	3
Scarlet fever	5
Tuberculosis	18
Typhoid fever	8
Whooping cough	13

KENTUCKY.

	Cases.
Cerebrospinal meningitis—Jefferson County	1
Chicken pox	3
Diphtheria	7
Dysentery	16
Influenza	3
Malaria	2
Measles	14
Mumps	1
Paratyphoid fever	2
Pellagra	1

KENTUCKY—continued.

Poliomyelitis:	Cases.
Carter County	1
Fulton County	1
Scarlet fever	11
Septic sore throat	1
Smallpox	21
Tonsillitis	3
Trachoma	13

KENTUCKY—continued.

Tuberculosis:	Cases.
Jefferson County	11
Scattering	8
Typhoid fever:	
Meade County	8
Scattering	62
Whooping cough	5

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles.	Pellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
June, 1921.										
Connecticut	9	294	7	5	287	.....	7	179	.....	39
Florida	.....	42	1	82	67	11	.....	4	133	70
Louisiana	1	21	20	284	52	37	.....	7	67	95
West Virginia	2	66	11	.....	135	.....	3	63	82	48

PLAGUE.[1]

HUMAN CASES OF PLAGUE REPORTED.

Place.	Period covered.	Cases.	Deaths.	Remarks.
California:	1921.			
San Benito County	Feb. 7	.....	1	
	June 11	1	.....	

[1] A summary of the reports received of the occurrence of plague and the finding of plague-infected rodents in the United States during 1920 was published in Public Health Reports, Jan. 7, 1921, p. 15.

PLAGUE-INFECTED RODENTS.

Place.	Period covered.	Rodents found plague infected.
California:	1921.	
San Benito County	May 22 to June 4	8
Florida:		
Pensacola	Jan. 1 to Apr. 18	5
	Apr. 19 to July 16	0
Louisiana:		
New Orleans	Jan. 1 to May 26	38
	May 27 to July 16	0
Texas:		
Galveston	Jan. 1 to May 28	1
	May 29 to July 16	0

[1] Ground squirrels, *Citellus beecheyi*.

TYPHUS FEVER.

Cleveland, Ohio, July 5, 1921.

One case of typhus fever was reported in Cleveland, Ohio, July 19, 1921. The patient, a student in an eastern college, became ill July 5.

CITY REPORTS FOR WEEK ENDED JULY 2, 1921.

CEREBROSPINAL MENINGITIS.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1920, inclusive. In instances in which data for the full six years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 2, 1921.		City.	Median for previous years.	Week ended July 2, 1921.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				New Jersey:			
Birmingham	0	1	.....	Bayonne	0	1	.....
California:				Jersey City	0	1	.....
Los Angeles	0	1	.....	New York:			
Oakland	0	1	.....	New York	6	7	3
San Francisco	1	2	.....	West Virginia:			
Illinois:				Huntington	0	.....	1
Chicago	2	2	1	Wisconsin:			
Maryland:				Milwaukee	0	1	.....
Baltimore	1	.....	1				
Michigan:							
Detroit	0	1	2				

DIPHTHERIA.

See p. 1716; also Telegraphic weekly reports from States, p. 1705, and Monthly summaries by States, p. 1709.

INFLUENZA.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
California:			Missouri:		
Long Beach	2	.....	Kansas City	.....	1
Oakland	4	.....	New York:		
San Francisco	1	.....	New York	5	1
Georgia:			Ohio:		
Atlanta	1	.....	Toledo	.....	1
Illinois:			Pennsylvania:		
Chicago	2	.....	Philadelphia	3	2
Maryland:			South Carolina:		
Baltimore	1	2	Charleston	.....	1
Massachusetts:			Texas:		
Boston	2	.....	Dallas	.....	1
Michigan:			Wisconsin:		
Detroit	4	.....	Green Bay	2	.....

LEPROSY.

California:			New York:		
Los Angeles	2	.....	New York	1	.....
New Jersey:			South Carolina:		
Newark	1	.....	Charleston	1	.....

LETHARGIC ENCEPHALITIS.

California:			Ohio:		
Riverside	1	1	Mansfield	.....	1
San Francisco	1	.....			

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

MALARIA.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			New York:		
Birmingham	2	1	New York	7	...
Mobile	...	1	North Carolina:		
California:			Charlotte	...	...
Sacramento	1	...	Winston-Salem	1	...
Georgia:			Ohio:		
Atlanta	1	1	Cleveland	2	...
Brunswick	9	...	Tennessee:		
Savannah	3	...	Memphis	...	1
Valdosta	...	1	Texas:		
Illinois:			Austin	...	1
Chicago	1	...	Beaumont	8	...
Kentucky:			Dallas	11	...
Louisville	1	...	Port Arthur	1	...
Massachusetts:			Waco	...	1
Boston	2	...	Virginia:		
New Jersey:			Alexandria	1	...
Irvington	1	...			

MEASLES.

See p. 1716; also Telegraphic weekly reports from States, p. 1705, and Monthly summaries by States, p. 1709.

PELLAGRA.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
Alabama:			South Carolina:		
Montgomery	...	3	Charleston	...	2
Kansas:			Tennessee:		
Coffeyville	1	...	Memphis	...	1
Louisiana:			Nashville	...	1
New Orleans	1	1	Texas:		
Pennsylvania:			Dallas	1	...
Philadelphia	1	1			

PNEUMONIA (ALL FORMS).

Alabama:			Illinois—Continued.		
Birmingham	...	2	Elgin	...	1
California:			Jacksonville	...	1
Berkeley	...	1	Kewanee	...	2
Long Beach	...	2	Oak Park	...	3
Los Angeles	11	3	Indiana:		
Oakland	...	3	East Chicago	...	2
Pasadena	2	...	Gary	...	2
San Diego	1	...	Indianapolis	...	2
San Francisco	6	4	Terre Haute	...	1
Santa Barbara	...	1	Kansas:		
Colorado:			Topeka	2	...
Denver	...	5	Wichita	...	2
Connecticut:			Kentucky:		
Bridgeport	...	1	Louisville	...	3
Fairfield	2	...	Louisiana:		
Hartford	...	1	New Orleans	...	4
New Britain	1	...	Maine:		
New Haven	...	1	Bangor	2	...
New London	...	1	Lewiston	...	1
Norwalk	...	1	Portland	...	1
Waterbury	1	...	Maryland:		
Delaware:			Baltimore	8	5
Wilmington	...	1	Cumberland	1	...
District of Columbia:			Massachusetts:		
Washington	...	5	Boston	...	11
Georgia:			Cambridge	...	1
Atlanta	...	2	Chelsea	1	...
Savannah	...	4	Chicopee	...	2
Illinois:			Easthampton	...	1
Aurora	3	2	Fall River	...	1
Blue Island	1	...	Haverhill	...	1
Chicago	70	19	Lawrence	4	1

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

PNEUMONIA (ALL FORMS)—Continued.

City.	Cases.	Deaths.
Massachusetts—Continued.		
Lowell	3	2
Lynn	1	
Malden	1	
New Bedford		1
Newton	1	
Northampton	1	
Quincy	2	
Salem		4
Somerville	1	
Springfield	9	1
Wakefield		1
Woburn		2
Worcester	2	1
Michigan:		
Alpena	1	
Ann Arbor	1	
Battle Creek	1	
Detroit	23	6
Grand Rapids	1	
Hamtramck		1
Highland Park	1	
Kalamazoo	2	1
Minnesota:		
Minneapolis		2
St. Paul		1
Missouri:		
Kansas City		6
St. Joseph		1
Springfield		1
Montana:		
Great Falls		1
New Hampshire:		
Keene		1
Manchester		1
Nashua		1
New Jersey:		
Atlantic City	2	1
East Orange	1	
Elizabeth		1
Hackensack		1
Hoboken		1
Jersey City	1	
Kearny		1
New Brunswick		1
Newark	20	3
Orange	5	
Passaic	2	
Summit	1	
Trenton		3
West Hoboken		1
New York:		
Binghamton	5	
Buffalo	10	4
Elmira	2	
Ithaca		1
Mount Vernon	1	
New York	138	64
Peekskill		1
Port Chester	1	
Rochester	4	2
Rome	1	
Schenectady	2	
Syracuse	4	
White Plains		1
Yonkers		2
North Carolina:		
Raleigh		3
Ohio:		
Akron	1	
Cincinnati		3
Cleveland	3	
Columbus		2
Dayton	1	
Findlay		1
Ironton		1
Newark		1
Toledo		5
Youngstown		3
Oregon:		
Portland		1
Pennsylvania:		
Philadelphia	35	23
Rhode Island:		
Providence		3
South Carolina:		
Charleston		3
Tennessee:		
Memphis		2
Texas:		
Austin		1
Dallas		2
El Paso		3
Utah:		
Salt Lake City		2
Vermont:		
Rutland		2
Virginia:		
Norfolk		1
Richmond		2
Wisconsin:		
Racine		1

POLIOMYELITIS (INFANTILE PARALYSIS).

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1920, inclusive. In instances in which data for the full six years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 2, 1921.	
		Cases.	Deaths.
Connecticut:			
Hartford	0		1
Waterbury		1	
Illinois:			
Chicago	1	1	
Springfield	0	3	
Maryland:			
Baltimore	0	3	
Massachusetts:			
Boston	0	2	
North Adams	0	1	
Michigan:			
Alpena	0	1	
Detroit	0	1	
New York:			
New York	4	4	1
Syracuse	0	1	
Pennsylvania:			
Erie	0	1	
Pittsburgh	0	2	
Wisconsin:			
Fond du Lac	0	1	

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

RABIES IN ANIMALS.

City.	Cases.	City.	Cases.
Massachusetts:		Missouri:	
Boston	1	Kansas City	3

RABIES IN MAN.

City.	Cases.	Deaths.	City.	Cases.	Deaths.
California:			Ohio:		
Los Angeles	1	1	Cincinnati	1	1

SCARLET FEVER.

See p. 1716; also Telegraphic weekly reports from States, p. 1705, and Monthly summaries by States, p. 1709.

SMALLPOX.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1920, inclusive. In instances in which data for the full six years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 2, 1921.		City.	Median for previous years.	Week ended July 2, 1921.	
		Cases.	Deaths.			Cases.	Deaths.
Alabama:				Maryland:			
Birmingham	0	5	.....	Cumberland	0	1	.....
Mobile	0	6	.....	Michigan:			
California:				Alpena	.....	3	.....
Berkeley	0	1	.....	Ann Arbor	0	1	.....
Los Angeles	1	2	.....	Battle Creek	1	1	.....
Oakland	0	4	.....	Detroit	8	21	1
Riverside	1	9	.....	Ishpeming	0	1	.....
San Diego	0	7	.....	Pontiac	3	12	.....
San Francisco	1	16	.....	Minnesota:			
Santa Cruz	0	2	.....	Duluth	2	6	.....
Colorado:				Minneapolis	11	16	.....
Denver	0	22	.....	St. Paul	3	15	.....
Pueblo	1	1	.....	Winona	0	4	.....
Trinidad	0	1	.....	Missouri:			
Georgia:				Kansas City	5	3	.....
Atlanta	4	10	.....	Montana:			
Savannah	0	3	.....	Billings	0	2	.....
Valdosta	.....	1	.....	Great Falls	4	4	.....
Illinois:				Nebraska:			
Chicago	2	7	.....	Lincoln	2	1	.....
Indiana:				Omaha	12	2	.....
Elkhart	0	2	.....	Nevada:			
Fort Wayne	0	2	.....	Reno	2	4	.....
Gary	1	3	.....	New Hampshire:			
Indianapolis	4	4	.....	Berlin	0	1	.....
Marion	1	6	.....	New Jersey:			
South Bend	0	4	.....	Trenton	.....	1	.....
Iowa:				North Carolina:			
Burlington	0	1	.....	Durham	0	1	.....
Council Bluffs	0	1	.....	Raleigh	0	4	.....
Des Moines	4	13	.....	Winston-Salem	0	2	.....
Mason City	0	1	.....	Ohio:			
Muscatine	0	3	.....	Akron	5	1	.....
Kansas:				Canton	0	1	.....
Fort Scott	2	4	.....	Cincinnati	1	1	.....
Hutchinson	0	3	.....	Columbus	0	1	.....
Kansas City	3	1	.....	Kenmore	.....	2	.....
Parsons	3	1	.....	Lancaster	0	2	.....
Wichita	5	6	.....	Marion	0	1	.....
Louisiana:				Massillon	0	3	.....
New Orleans	1	2	.....	Newark	0	5	.....
				Toledo	1	2	.....

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

SMALLPOX—Continued.

City.	Median for previous years.	Week ended July 2, 1921. Cases.	Deaths.
Oregon:			
Portland	8	6	.....
Pennsylvania:			
Williamsport	.....	1	.....
South Carolina:			
Charleston	0	1	.....
Columbia	0	1	.....
South Dakota:			
Sioux Falls	0	1	.....
Tennessee:			
Chattanooga	0	1	.....
Utah:			
Salt Lake City	6	9	.....
Virginia:			
Lynchburg	0	1	.....
Washington:			
Everett	1	1	.....
Spokane	15	4	.....
Tacoma	5	1	.....
Vancouver	0	7	.....
West Virginia:			
Bluefield	3	7	.....
Wisconsin:			
Madison	0	1	.....
Milwaukee	2	5	.....
Oshkosh	1	1	.....
Racine	0	1	.....
Superior	3	2	.....
Wausau	0	1	.....

TETANUS.

City.	Cases.	Deaths.
California:		
San Francisco	1	1
Illinois:		
Chicago	3	1
Massachusetts:		
North Adams	1	.....
Missouri:		
St. Louis	1	.....
Nebraska:		
Omaha	2	2
New Jersey:		
Trenton	.....	1
New York:		
Rome	1	1
Ohio:		
Cleveland	1	.....
Toledo	.....	1
Pennsylvania:		
Philadelphia	1	1
Rhode Island:		
Pawtucket	.....	1
Tennessee:		
Knoxville	1	.....
Texas:		
Dallas	1	1
Galveston	.....	1

TUBERCULOSIS.

See p. 1716; also Telegraphic weekly reports from States, p. 1705.

TYPHOID FEVER.

The column headed "Median for previous years" gives the median number of cases reported during the corresponding weeks of the years 1915 to 1920, inclusive. In instances in which data for the full six years are incomplete, the median is that for the number of years for which information is available.

City.	Median for previous years.	Week ended July 2, 1921. Cases.	Deaths.
Alabama:			
Birmingham	2	6	.....
Mobile	2	3	.....
Arkansas:			
Little Rock	1	5	.....
North Little Rock	0	1	.....
California:			
Sacramento	1	2	.....
San Francisco	2	1	.....
Santa Barbara	0	1	.....
Colorado:			
Denver	0	.....	1
Connecticut:			
Hartford	1	2	.....
New Britain	0	1	.....
New Haven	0	2	.....
Georgia:			
Atlanta	2	5	.....
Brunswick	1	1	.....
La Grange	.....	7	.....
Macon	.....	1	.....
Savannah	2	3	.....
Valdosta	.....	1	.....
Illinois:			
Chicago	6	5	.....
East St. Louis	0	.....	1
Indiana:			
Indianapolis	1	2	.....
Logansport	0	1	.....
Mishawaka	0	1	1
Muncie	3	5	.....
Richmond	0	1	.....

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

TYPHOID FEVER—Continued.

City.	Median for previous years.	Week ended July 2, 1921.	
		Cases.	Deaths.
Kansas:			
Kansas City	1	1	.....
Lawrence	0	1	.....
Wichita	0	1	.....
Kentucky:			
Covington	0	1	.....
Lexington	1	15	.....
Louisville	3	1	.....
Louisiana:			
Baton Rouge	0	1	1
New Orleans	10	2	1
Maine:			
Portland	1	1	.....
Maryland:			
Baltimore	5	7	.....
Cumberland	0	1	1
Massachusetts:			
Arlington	0	1	.....
Boston	3	3	.....
Chelsea	0	1	.....
Lowell	0	.....	1
Northampton	0	1	.....
Salem	0	1	.....
Springfield	0	.....	1
Worcester	0	.....	1
Michigan:			
Detroit	6	3	.....
Flint	2	1	.....
Grand Rapids	1	1	.....
Muskegon	0	3	.....
Minnesota:			
Austin	.....	1	.....
Minneapolis	2	2	.....
Missouri:			
Joplin	3	1	.....
Kansas City	1	2	1
St. Louis	4	1	.....
Montana:			
Billings	0	1	.....
Nebraska:			
Omaha	0	1	.....
New Hampshire:			
Manchester	0	1	.....
New Jersey:			
Atlantic City	0	1	.....
Clifton	.....	1	.....
Hoboken	0	1	.....
Jersey City	0	2	.....
Passaic	0	1	.....
Paterson	0	2	.....
New York:			
Albany	1	1	.....
Auburn	0	1	.....
Binghamton	0	1	1
Mount Vernon	0	.....	1
New York	23	16	3
Niagara Falls	0	.....	1
North Carolina:			
Durham	1	8	.....
Raleigh	0	1	.....
Winston-Salem	3	2	.....
Ohio:			
Alliance	0	1	1
Cincinnati	2	1	1
Cleveland	4	2	.....
Ironton	2	1	.....
Lancaster	0	1	.....
Springfield	0	1	.....
Toledo	2	1	.....
Oklahoma:			
Tulsa	5	5	.....
Pennsylvania:			
Carnegie	0	1	.....
Chambersburg	0	1	.....
Jeannette	.....	3	.....
McKeesport	0	1	.....
Philadelphia	8	6	.....
Pittsburgh	2	3	.....
Reading	1	1	.....
Uniontown	0	1	.....
Rhode Island:			
Providence	2	4	.....
South Carolina:			
Charleston	10	2	1
Tennessee:			
Knoxville	5	2	.....
Memphis	3	7	.....
Nashville	5	5	1
Texas:			
Beaumont	0	1	1
Dallas	5	3	1
El Paso	2	.....	1
Port Arthur	.....	3	.....
Utah:			
Salt Lake City	1	2	.....
Vermont:			
Rutland	0	1	.....
Virginia:			
Alexandria	0	2	2
Danville	0	1	.....
Norfolk	2	7	.....
Portsmouth	1	1	.....
Richmond	1	1	.....
West Virginia:			
Charleston	4	1	1
Fairmont	1	1	.....
Wheeling	1	1	.....
Wisconsin:			
Ashland	0	1	.....
Milwaukee	2	3	.....
Wyoming:			
Cheyenne	0	2	.....

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS.

City.	Population January 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Alabama:										
Anniston	17,734		1						2	
Birmingham	178,270	54	1		9				7	8
Mobile	60,151	15	1	1						2
Montgomery	43,464	19	1				1		1	1
Tuscaloosa	11,996								1	
Arkansas:										
Hot Springs	11,695	4								1
Little Rock	64,997				2					
North Little Rock	14,048		1		5		1			
California:										
Alameda	28,806	2								
Bakersfield	18,638	6			3		1			1
Berkeley	55,886	10								
Eureka	12,923	2								
Long Beach	55,593	23	1		1					
Los Angeles	576,673	140	32	1	18		6		79	16
Oakland	216,361	43	9	1	4		1			2
Pasadena	45,354	5			3		2			
Richmond	16,843	1	2							
Riverside	19,341	8							1	1
Sacramento	65,857	14	8						4	
San Bernardino	18,721	8			1					1
San Diego	74,683	25	1		78				3	6
San Francisco	508,410	112	23	3	7		42			10
Santa Barbara	19,441	4								1
Santa Cruz	10,917	3								
Colorado:										
Colorado Springs	30,105	10							15	2
Denver	256,369	66	14		4	1	5			10
Pueblo	42,908		5	1			2		1	1
Trinidad	10,906				1					
Connecticut:										
Bridgeport	143,538	23	5		1			1	6	2
Bristol	20,620	1								
Danbury (city)	18,943	5	1	1						
Derby	11,238	10								1
Greenwich (town)	22,128		3		3		1			
Hartford	138,036	37	6		10		3		9	1
Meriden (city)	29,842		2						1	
Milford (town)	10,193	0			1					
New Britain	59,316	11	2							1
New Haven	162,519	23	4		1		1		3	1
New London	25,688	5							2	
Norwalk	27,700	14	1				3			1
Norwich (city)	22,304	5							1	1
Stamford (city)	35,096		6		5		9	2	8	
Stonington (town)	10,236	0								
Waterbury	91,410	17	1		8		1		3	1
Delaware:										
Wilmington	110,168	35					7			5
District of Columbia:										
Washington	437,571	101	12	1	43		4		19	8
Georgia:										
Atlanta	200,616	57	1				2			5
Brunswick	14,413	2							1	
Macon	52,995		1							
Savannah	83,252	33								2
Valdosta	10,783	3								
Idaho:										
Boise	21,393	5	1				3			
Illinois:										
Alton	24,682	8			2				1	
Aurora	36,397	11	1	1			1		2	2
Bloomington	28,725	4					1		1	
Blue Island	11,424	3	6	1			1			
Centralia	12,491	5								
Chicago	2,701,705	550	114	11	157	5	43	1	180	61
Cicero	44,995	6	1		1		1			1
Danville	33,750	8					1			
Decatur	43,818	5	2							1
East St. Louis	66,740	13								
Elgin	27,454	10	1				2		1	1
Evanston	37,215	6	1							

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population, January 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Illinois—Continued.										
Forest Park	10,768				1					
Freeport	19,669	7	1							1
Galesburg	23,834	5			1					
Jacksonville	15,713	5								1
Kewanee	16,026	5			1					
La Salle	13,050	6	1							
Mattoon	13,552	4								
Oak Park	39,830	9	1		7					
Pekin	12,086						1			
Rockford	65,651	7			1		1		2	
Springfield	59,183	16	1		1	1				
Indiana:										
East Chicago	35,967	8								
Elkhart	24,277	8	1		2					1
Fort Wayne	86,549	13	2				1			
Gary	55,378	13	1				1			
Hammond	36,004	8	1				1			
Huntington	14,000	2	1							
Indianapolis	314,194	68	2				3		16	8
Kokomo	30,067	9	1						2	1
La Fayette	22,486	7								
Logansport	21,626	2								
Marion	23,747	7	1							2
Mishawaka	15,195	4								
Muncie	36,524	10	1		1		2			2
Richmond	26,765	4					1			
South Bend	70,983	7	1		1				3	
Terre Haute	66,083	23			1					2
Iowa:										
Burlington	24,057	8							1	1
Council Bluffs	36,162	5			1					
Davenport	56,727		1				2			
Des Moines	126,468		4				2			
Iowa City	11,267				5					
Mason City	20,065	4					1			
Muscatine	16,068	4					1			
Kansas:										
Atchison	12,630				1					
Coffeyville	13,452	9							1	
Fort Scott	10,603	4							1	
Hutchinson	23,298		1				3			
Kansas City	101,177		1		2				3	
Lawrence	12,456	3								
Leavenworth	16,912		4							
Parsons	16,028	4								
Topeka	50,022	4			1		1		3	
Wichita	72,128	30	1		2	1	2			2
Kentucky:										
Covington	57,121	8							2	
Lexington	41,534	19			1				9	1
Louisville	234,891	93	5		9		3		6	9
Louisiana:										
Baton Rouge	21,782	15							1	1
New Orleans	387,219	112	3				2		16	15
Maine:										
Auburn	16,985	3								
Bangor	25,978						2		1	
Biddeford	18,008	6								
Lewiston	31,791	7	1	1			1			
Portland	69,272	12	2		1		1			
Sanford	10,691	1								
Waterville	13,351				1		1			
Maryland:										
Baltimore	733,826	209	21	1	38	1	5		25	22
Cumberland	29,837	14	2						2	
Massachusetts:										
Adams	12,967	1					4			
Amesbury	10,036	1								
Arlington	18,665	4			8				3	1
Attleboro	19,731	2							1	
Belmont	10,749	2								
Beverly	22,561	5					2		1	
Boston	748,060	150	63	2	94	2	18	1	44	15

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population January 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Massachusetts—Continued.										
Braintree	10,580	1			1					1
Brookline	37,748	4								
Cambridge	109,694	24	2		4		3	1	7	2
Chelsea	43,184	10	1		6		1		3	
Chicopee	36,214	5								
Clinton	12,979	4								
Danvers	11,108		1	1	7				1	
Dedham	10,792	5								
Easthampton	11,261	2							2	1
Everett	40,120	7	4				1		1	
Fall River	120,485	24	2		2		1		4	1
Gardner	16,971	4							2	2
Haverhill	53,884	14	7		1				2	
Holyoke	60,203	17							2	
Lawrence	94,270	15	1	1	4		1	1	3	
Leominster	19,744	2					2			
Lowell	112,479	23	3				1		3	2
Lynn	99,148	12	3		27		2		4	1
Malden	49,103	14	1		1		1			2
Medford	39,038	4	3		5		4		4	
Melrose	18,204	4							3	1
Methuen	15,189	6			1		7			
New Bedford	121,217	24	1	2			4		12	4
Newburyport	15,618	2			2					
Newton	46,054	4	3	1			1			
North Adams	22,282	0								
Northampton	21,951	1			1				2	1
Pittsfield	41,751	8							2	2
Plymouth	13,045	3								
Quincy	47,876	1			39				2	
Salem	42,529	9	4				1		1	1
Saugus	10,874	3			2					
Somerville	93,091	11			8		4		5	
Southbridge	14,245	2								
Springfield	129,563	20	2		1		1		2	1
Taunton	37,137	5			2					
Wakefield	13,025	4			2		1		1	
Watertown	21,457	2							1	
West Springfield	13,443	4			6					
Westfield	18,604	2							1	1
Winthrop	15,455	2								
Woburn	16,574	2								
Worcester	179,754	30	3		2		2		4	2
Michigan:										
Ann Arbor	19,516	6		1						
Battle Creek	36,164						1			
Detroit	993,739	162	64	4	30		52	1	25	17
Flint	91,599	12	3		3		2			
Grand Rapids	137,634	23	6		1		2		5	
Hamtramck	48,615	10			2		3		2	
Highland Park	46,499	7							1	
Holland	12,166	2								
Ironwood	15,739	2	1		1					
Ishpeming	10,500	0								
Kalamazoo	48,958	21	3				2		1	1
Marquette	12,718	1								
Muskegon	36,570	5							1	2
Pontiac	34,273	5	4				6			1
Port Huron	25,944	7	1							
Sault Ste. Marie	12,096	3						1		
Minnesota:										
Austin	10,118	1					1			
Duluth	98,917	8			6		3		9	
Hibbing	15,089		3		1				1	
Minneapolis	380,582	75	18	2	11		10	1	15	5
Rochester	13,722	19	1	1					1	1
St. Cloud	15,873	1	1							
St. Paul	234,595	45	9	1	4		7		10	3
Virginia	14,022	1	1							
Winona	19,143				1		3		2	

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population January 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Missouri:										
Cape Girardeau	10,232	7								2
Independence	11,686	3	1	1						
Kansas City	324,410	77	6		7		2		1	3
Saint Joseph	77,939	28	1							
Saint Louis	772,897	171	20	2	5		23		41	9
Springfield	39,631	12								
Montana:										
Billings	15,100	3					1		1	
Great Falls	24,121	6							1	
Missoula	12,668	4								
Nebraska:										
Lincoln	54,934	18			1					
Omaha	191,601	52	1	1	5		2			8
Nevada:										
Reno	12,016	5							1	1
New Hampshire:										
Berlin	16,104	4								
Concord	22,167	8			2					1
Dover	13,029	4	2	1						
Keene	11,210	1							1	
Manchester	78,384	15	3							3
Nashua	28,379	8	3				1			1
Portsmouth	13,569				1					
New Jersey:										
Atlantic City	50,682	10	2		1		3		3	
Bayonne	76,754		1				6		3	
Belleville	15,660								1	
Bloomfield	22,019	3			1		1			
Clifton	26,470	2	1		5		1		1	
East Orange	50,710		1		3				3	
Elizabeth	96,682		4	1	12					2
Englewood	11,627	4								
Garfield	19,381						1		1	
Gloucester City	12,162		1							
Hackensack	17,667	2			1					
Harrison	15,721						2			
Hoboken	68,166	16	1				1		1	1
Irvington	25,480		1		1				1	
Jersey City	297,864		10		10		6		12	
Kearney	26,724	6			2				1	
Montclair	28,810	4								
Morristown	12,548	3			3					
New Brunswick	32,779		3				2			
Newark	414,216	71	7		16		10		37	4
Onrage	33,268	7			15		2			
Passaic	63,124	12	2		3		3		3	
Paterson	135,866		7		10		5			
Perth Amboy	41,707	7	1				1			
Phillipsburg	16,923	2								
Plainfield	27,700	7	1				1		1	
Summit	10,174	1								
Trenton	119,289	37	1		16		1	1	4	2
Union	20,651		1							
West Hoboken	40,068	5	1							
West New York	29,926	1	1				1			
West Orange	15,573	3			3					
New Mexico:										
Albuquerque	15,157	13							2	6
New York:										
Albany	113,344		5		8		1		7	
Auburn	36,192	4	1				5			1
Binghampton	66,800	11	2						5	1
Buffalo	506,775	107	23	2	19	1	19	2	10	7
Cohoes	22,987	3								
Elmira	45,305	10								
Geneva	14,648	2		1						
Glens Falls	16,638	5	1						1	
Ithaca	17,004	7							1	
Lockport	21,308	5					1			1
Mount Vernon	42,726	6			3		1		1	
Newburgh	30,366	8	1							
New York	5,621,151	1,072	254	12	159	8	104	4	[1] 268	[1] 104

[1] Pulmonary tuberculosis only.

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population January 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
New York—Continued.										
Niagara Falls	50,760	6	1	.....	.....	.....	6	.....	2	.....
Olean	20,506	2	2	1	.....	.....	2	.....	.....	.....
Peekskill	15,868	4	.....	.....	1	.....	.....	.....	.....	.....
Plattsburg	10,909	3	.....	.....	.....	.....	.....	.....	.....	.....
Port Chester	16,573	2	1	.....	9	.....	.....	.....	.....	.....
Rochester	295,750	53	11	3	5	.....	4	.....	7	3
Rome	26,341	.....	2	.....	.....	.....	.....	.....	.....	.....
Saratoga Springs	13,181	2	.....	.....	.....	.....	.....	.....	1	.....
Schenectady	88,723	15	7	.....	19	.....	.....	.....	2	1
Syracuse	171,717	41	2	.....	25	.....	2	.....	3	4
Troy	72,013	.....	.....	.....	.....	.....	.....	.....	1	.....
Watertown	31,285	.....	.....	.....	19	.....	.....	.....	1	.....
White Plains	21,031	6	.....	.....	.....	.....	.....	.....	.....	.....
Yonkers	100,226	17	.....	.....	4	.....	3	.....	.....	.....
North C.rolina:										
Charlotte	46,338	18	.....	.....	1	.....	.....	.....	6	.....
Durham	21,719	10	1	.....	.....	.....	.....	.....	1	2
Greensboro	19,861	11	.....	.....	.....	.....	.....	.....	.....	.....
Raleigh	24,418	15	.....	.....	1	.....	.....	.....	2	.....
Rocky Mount	12,742	5	.....	.....	.....	.....	.....	.....	.....	.....
Salisbury	13,884	3	.....	.....	.....	.....	.....	.....	.....	.....
Winston-Salem	48,395	13	1	.....	2	.....	2	.....	3	3
Ohio:										
Akron	208,435	31	2	.....	2	.....	1	.....	9	.....
Alliance	21,603	4	.....	.....	.....	.....	2	.....	.....	.....
Barberton	18,811	1	1	.....	.....	.....	.....	.....	1	.....
Bucyrus	10,425	0	.....	.....	.....	.....	.....	.....	.....	.....
Canton	87,091	7	4	.....	1	.....	2	.....	2	.....
Cincinnati	401,247	104	5	.....	4	.....	3	.....	39	11
Cleveland	796,836	.....	23	.....	18	.....	29	.....	.....	.....
Cleveland Heights	15,236	.....	.....	.....	.....	.....	.....	.....	1	.....
Columbus	237,031	54	6	.....	.....	.....	1	.....	5	3
Coshocton	10,847	.....	.....	.....	.....	.....	.....	.....	1	.....
Cuyhoga Falls	10,200	1	.....	.....	.....	.....	1	.....	.....	.....
Dayton	152,559	41	2	.....	1	.....	1	.....	2	.....
East Cleveland	27,292	8	.....	.....	.....	.....	1	.....	.....	.....
Findlay	17,021	5	8	1	.....	.....	.....	.....	.....	.....
Fremont	12,458	2	.....	.....	.....	.....	.....	.....	.....	.....
Hamilton	39,675	4	.....	.....	.....	.....	.....	.....	1	.....
Ironton	14,007	2	.....	.....	.....	.....	.....	.....	.....	.....
Kenmore	12,683	3	.....	.....	.....	.....	.....	.....	1	.....
Lancaster	14,706	6	.....	.....	.....	.....	.....	.....	.....	.....
Lima	41,305	4	.....	.....	.....	.....	.....	.....	.....	.....
Mansfield	27,324	9	.....	.....	1	.....	.....	.....	.....	1
Massillon	17,428	9	.....	.....	.....	.....	1	.....	.....	.....
Middletown	23,594	6	.....	.....	.....	.....	.....	.....	1	1
Newark	25,718	9	.....	.....	.....	.....	.....	.....	.....	.....
Niles	13,080	0	.....	.....	.....	.....	4	.....	.....	.....
Norwood	24,966	4	1	.....	.....	.....	.....	.....	.....	.....
Salem	10,305	2	.....	.....	.....	.....	.....	.....	.....	.....
Sandusky	22,897	6	.....	.....	1	.....	.....	.....	1	.....
Springfield	60,840	3	3	.....	3	.....	.....	.....	4	1
Steubenville	28,508	8	1	.....	.....	.....	1	.....	.....	.....
Tiffin	14,375	5	.....	.....	.....	.....	.....	.....	.....	.....
Toledo	243,109	55	10	2	2	.....	4	.....	2	2
Youngstown	132,358	24	3	.....	6	.....	4	.....	3	2
Zanesville	29,569	10	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma:										
Tulsa	72,075	.....	2	.....	1	.....	.....	.....	.....	.....
Oregon:										
Portland	258,288	33	8	2	9	.....	3	.....	1	1
Pennsylvania:										
Allentown	73,502	.....	4	.....	1	.....	.....	.....	.....	.....
Altoona	60,331	.....	3	.....	3	.....	2	.....	.....	.....
Berwick	12,181	.....	2	.....	.....	.....	.....	.....	.....	.....
Bethlehem	50,358	.....	.....	.....	4	.....	.....	.....	.....	.....
Braddock	20,879	.....	.....	.....	.....	.....	1	.....	.....	.....
Bradford	15,525	.....	.....	.....	1	.....	.....	.....	.....	.....
Butler	23,778	.....	.....	.....	2	.....	.....	.....	.....	.....
Carnegie	11,516	.....	.....	.....	.....	.....	.....	.....	1	.....
Chester	58,030	.....	6	.....	.....	.....	10	.....	3	.....
Dunmore	20,250	.....	1	.....	4	.....	3	.....	.....	.....

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population January 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Pennsylvania—Continued.										
Duquesne	19,011						6			
Easton	33,813				2					
Erie	93,372		8		25		1		7	
Farrell	15,586				2		1		1	
Harrisburg	75,917				3					
Hazleton	32,277				2					
Johnstown	67,327		2		2					
Lancaster	53,150		2							
Lebanon	24,643								2	
McKeesport	45,975				1		2		2	
McKees Rocks	16,713		1		4				2	
New Castle	44,938		1						2	
Norristown	32,319						1			
North Braddock	14,928		1							
Oil City	21,274								1	
Olyphant	10,236								3	
Philadelphia	1,823,158	448	57	4			56	1	75	30
Phoenixville	10,484								1	
Pittsburgh	588,193		12		36		13		12	
Pittston	18,497		1							
Reading	107,784		3		6				8	
Scranton	137,783		1		2					
Swissvale	10,908				2					
Uniontown	15,692		1				2			
Warren	14,256				4		1			
Wilkes-Barre	73,833		2		1		1		1	
Williamsport	36,198		2							
Rhode Island:										
Cranston	29,407	5	3		4			1		
Newport	30,255	3					5			
Pawtucket	64,248	12								1
Providence	237,595	66	1		3		2			8
South Carolina:										
Charleston	67,957	28								1
Columbia	37,524				3		1		1	
South Dakota:										
Sioux Falls	25,176	1								
Tennessee:										
Chattanooga	57,895		1							
Knoxville	77,818				2	1			2	2
Memphis	162,351	57	1		2				21	8
Nashville	118,342	42			9		2		1	5
Texas:										
Austin	34,876	22	2							3
Beaumont	40,422	11								1
Corpus Christi	10,522	2			1					
Dallas	158,976	35	3		11		1		3	3
El Paso	77,543	50			2		1			9
Galveston	44,255	12								1
Port Arthur	22,251	3	1							
Waco	38,500	13								2
Utah:										
Salt Lake City	118,110	20	8	1			2			2
Vermont:										
Barre	10,008				6					
Burlington	22,779	8	1				1			
Rutland	14,954	9	1							1
Virginia:										
Alexandria	18,060	5		1						
Danville	21,539	5	1							
Lynchburg	29,956	7			6				2	
Norfolk	115,777		1		2		1		3	2
Petersburg	31,002	15			4				4	1
Portsmouth	54,387	13							3	
Richmond	171,667	47	4	1	14				32	2
Roanoke	50,842	24	3						1	
Washington:										
Everett	27,644		1		8					
Seattle	315,652		22		1		2		4	
Spokane	104,437		1		45		1			
Tacoma	96,965		1		12		1			
Yakima	18,539				1					

CITY REPORTS FOR WEEK ENDED JULY 2, 1921—Continued.

DIPHTHERIA, MEASLES, SCARLET FEVER, AND TUBERCULOSIS—Continued.

City.	Population January 1, 1920, subject to correction.	Total deaths from all causes.	Diphtheria.		Measles.		Scarlet fever.		Tuberculosis.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths	Cases.	Deaths.
West Virginia:										
Charleston	39,608	14					1			
Fairmont	17,851						1			
Huntington	50,177	23	1							
Martinsburg	12,515		2							
Moundsville	10,669	2								
Parkersburg	20,050	8								1
Wheeling	54,322	17			2					2
Wisconsin:										
Appleton	19,561						3			
Beloit	21,284	1							1	
Fond du Lac	23,427		2				1			
Green Bay	31,017	6	4		2					1
Janesville	18,293	5					1			
Kenosha	40,472	5			1				1	
Madison	38,378	3			1					
Milwaukee	457,147		24		11		8		28	
Oshkosh	33,162	7					1			
Racine	58,593	10	2		2		7		2	
Superior	39,624	6					8			
Wausau	18,661				1					
Wyoming:										
Cheyenne	13,829	3					1			

FOREIGN AND INSULAR.

AUSTRALIA.

Influenza—Brisbane, Queensland.

During the week ended May 28, 1921, 9 cases of influenza were notified at Brisbane, Australia.

Area of Notification Restricted.

By official order dated February 24, 1921, the notification of influenza, which was established August 7, 1919, was declared to be restricted to certain areas, including the area of the city of Brisbane.

CHINA.

Epidemic Plague—Hongkong.

Information of epidemic plague at Hongkong, China, was received under date of July 14, 1921.

GERMANY.

Trachoma—Cologne.

During the week ended May 28, 1921, 8 cases of trachoma were reported at Cologne, Germany. The disease was stated to have been introduced into Cologne during the war by prisoners.

JAMAICA.

Infectious Disease (Alastrim or Kaffir Pox).

During the week ended June 18, 1921, 130 new cases of alastrim or Kaffir pox were reported in the Island of Jamaica.

Measles[1]—Typhoid Fever.

Measles continued to be reported in Jamaica with a large number of cases, and epidemic typhoid fever has been reported present.

MEXICO.

Plague—Human Cases—Rodent Cases—Tampico.

Plague has been reported at Tampico, Mexico, as follows: During the 10 days ended June 30, 1921, 10 cases; 10 days ended July 10, 1921, 7 cases. During the 10-day period ended July 10, 1921, 21 cases of rodent plague were reported.

[1] Public Health Reports, May 6, 1921, p. 1021, and June 3, 1921, p. 1298.

PORTO RICO.

Examination of Rats—Plague Rat Found.

During the week ended July 2, 1921, 4,460 rats were examined in Porto Rico. One rat taken at Santurce was found plague-infected, making a total of 88 plague-infected rats found from the beginning of the outbreak.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER.

Reports Received During Week Ended July 22, 1921.[1]

CHOLERA.

Place.	Date.	Cases.	Death.	Remarks.
India				Mar. 20-Apr. 9, 1921: Deaths, 7,512.
Madras	May 28-June 4	1	1	
Rangoon	May 8-21	3	4	
Indo-China:				
Saigon	May 9-15	51	36	
Philippine Islands:				
Manila	May 22-28	1		
Province—				
Pampanga	June 5-11	1	1	

PLAGUE.

Brazil:				
Bahia	May 15-21	1	1	
China:				
Amoy	do		2	
Foochow	do			Present.
Hongkong	July 11			Epidemic.
Manchuria—				
Harbin	May 17-22	6		
Egypt				Jan. 1-June 16, 1921: Cases, 162; deaths, 76.
Cities—				
Alexandria	June 21-16		1	
Port Said	June 16	2	1	
Suez	June 11-15	2	1	One case pneumonic.
Provinces—				
Assiout	June 15-16	2	1	One case septicemic.
Gharbieh	June 11-14	2		
Minieh	June 10	1		
India				May 15-21, 1921: Cases, 262; deaths, 212.
Bombay	May 8-21	123	87	
Karachi	May 29-June 4	4	3	
Madras Presidency	May 22-June 4	64	43	
Rangoon	May 8-28	38	34	
Indo-China:				
Saigon				May 8-15, 1921: One plague rat.
Mesopotamia:				
Bagdad	Apr. 1-30	5	2	
Mexico:				
Tampico	June 21-July 10	17		July 1-10: Plague-infected rats found, 21.
Straits Settlements:				
Singapore	May 15-21	1	1	

SMALLPOX.

Brazil:				
Pernambuco	Mar. 28-May 22	28	4	
Canada:				
New Brunswick—				
Restigouche County	June 19-25	1		
Nova Scotia—				
Sydney	June 26-July 2	4		

[1] From medical officers of the Public Health Service, American consuls and other sources.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended July 22, 1921—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Canada—Continued.				
Ontario—				
North Bay	June 11-25	3		
Do	June 26-July 2	1		
Toronto	do	3		
Chile:				
Arica	May 31	2		
China:				
Amoy	May 15-21		1	
Chungking	do			Present.
Foochow	do			Do.
Manchuria—				
Harbin	May 16-29	2		
Tientsin	May 15-28	13		Reported by 1 mission hospital.
Tsingtau	May 16-22	1	1	
Colombia:				
Santa Marta	June 19-25			Present.
Cuba:				
Antilla	June 26-July 2	4		
Cienfuegos	do	1		
Egypt:				
Port Said	Apr. 2-8	1		
Great Britain:				
Nottingham	May 29-June 4	1		
Greece:				
Saloniki	June 6-12		1	
Haiti:				
Cape Haitien	June 19-25	24	2	
India				Mar. 20-Apr. 9, 1921: Deaths, 1,944.
Bombay	May 8-21	48	19	
Karachi	May 29-June 4	15	14	
Madras	May 22-June 4	18	5	
Rangoon	May 8-28	9	1	
Indo-China:				
Saigon	May 9-15	1	1	
Italy:				
Catania	June 14-20			In Province, 3 cases.
Genoa	Apr. 1-May 31	11		
Messina	May 23-June 5	1	1	
Palermo	June 1-14	2		
Japan:				
Nagasaki	June 6-12	1		
Java:				
West Java—				
Batavia	May 6-12	2		
Garoet	do	1		
Krawang	do	7		
Mesopotamia:				
Bagdad	Apr. 1-30	3	1	
Mexico:				
Chihuahua	June 20-27		1	
Mexico City	May 22-June 11	124		
Spain:				
Barcelona	June 9-15		1	
Switzerland:				
Zurich	June 5-11	5		
Tunis:				
Tunis	June 11-17	1	1	
Turkey:				
Constantinople	June 5-11	7		
Union of South Africa:				
Orange Free State	May 22-28			Outbreaks.
Transvaal	do			Outbreak.

TYPHUS FEVER.

Algeria:				
Oran	June 1-10	7	5	
China:				
Antung	May 30-June 5	1		
Hankow	June 5-11	1		
Manchuria—				
Harbin	May 23-29	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received During Week Ended July 22, 1921—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Egypt:				
Alexandria	June 4-16	10	1	
Cairo	Apr. 2-15	33	8	
Port Said	do	8	1	
Greece:				
Saloniki	May 23-June 12	20	3	Of these, 15 among Russian refugees.
Mexico:				
Mexico City	May 22-June 11	55		Including municipalities in Federal district.
Spain:				
Madrid	May 1-31		1	
Tunis:				
Tunis	June 11-17		3	
Union of South Africa:				
Cape Province	May 22-28			Outbreaks.
East London	do		1	
Orange Free State	do			Do.

Reports Received from July 2 to 15, 1921.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
India				Mar. 6-19, 1921: Deaths, 3,646.
Bombay	May 1-7	1	1	
Calcutta	May 8-21	159	138	
Madras	May 15-21	1		
Rangoon	Apr. 24-May 7	11	9	
Indo-China				Jan. 1-31, 1921: Cases, 80; deaths, 15.
Provinces—				
Anam	Jan. 1-31	42		In January, 1920: No cases.
Cambodia	do	8	2	January, 1920: Cases, 27; deaths, 14.
Cochin-China	do	18	9	January, 1920: Cases, 13; deaths, 10.
Tonkin	do	12	4	January, 1920: No cases.
Siam:				
Bangkok	Apr. 24-May 7	4	1	

PLAGUE.

Brazil:				
Maranhao	June 28	1	1	
British East Africa:				
Kenya Colony—				
Kisumu	Apr. 24-May 21			Present.
Ceylon:				
Colombo	May 8-14	1	1	
China:				
Manchuria—				
Harbin	May 3-16	40		
Ecuador:				
Guayaquil	May 1-31	9	1	
Egypt				Jan. 1-June 2, 1921: Cases, 142; deaths, 68.
Cities—				
Alexandria	May 21-June 1	7	2	
Suez	May 20-June 2	3	3	
Provinces—				
Assiout	May 24-27	7	6	
Gharbieh	June 2	1		
Minieh	May 28	1	1	

[1] From medical officers of the Public Health Service, American consuls, and other sources. For reports received from Jan. 1 to July 1, 1921, see Public Health Reports for July 1, 1921. The tables of epidemic diseases are terminated semiannually and new tables begun.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 2 to 15, 1921—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
India				May 1-14, 1921: Cases, 944; deaths, 747.
Bombay	May 1-7	73	54	
Calcutta	May 8-21	7	7	
Karachi	May 8-28	10	8	
Rangoon	Apr. 24-May 7	22	23	
Indo-China				Jan. 1-31, 1921: Cases 57; deaths, 51.
Mexico:				
Tampico	June 11-20	26		Last case, June 18, 1921. Total from Jan. 1 to June 18, 1921; 145.
Peru				Mar. 1-31, 1921: Cases, 76; deaths, 44. Apr. 1-30, 1921: Cases, 43; deaths, 20.
Department—				
Arequipa	Mar. 1-31	2		At Mollendo.
Callao	do	7	1	At Callao.
Lambayeque	do	2	1	At Chiclayo.
Libertad	do	12	7	In 5 localities.
Lima	do	32	16	At Lima city, 20 cases, 13 deaths.
Piura	do	21	19	At Payta, Piura, and Sullana.
Ancachs	Apr. 1-30	4	1	At Huarmey.
Arequipa	do	3	3	At Mollendo.
Callao	do	8		At Callao.
Lambayeque	do	1	1	At Chiclayo.
Libertad	do	16	5	In 5 localities.
Lima	do	6	3	In Lima city, 3 cases, 1 death.
Piura	do	5	7	At Payta, Sullana, and Talara.
Siam:				
Bangkok	Apr. 24-30	1	1	
Straits Settlements:				
Singapore	May 8-14	1	1	
On vessel:				
S. S. Kishenev	May 2	1		At Chefoo, China. Plague death en route. Vessel sent to quarantine, Kentucky Island, where to May 6 a total of 16 deaths was reported. (Public Health Reports, July 1, 1921, p. 1534.)
S. S. Oreland				At Genoa, Italy, June 12, 1921, from La Plata, Argentina. Two fatal cases plague in crew en route.

SMALLPOX.

Algeria:				
Algiers	May 1-31	2		
Asia Minor:				
Smyrna	May 22-28	1		On the s. s. Nicholas.
Australia:				
Melbourne	Apr. 9-23	4	1	Mild epidemic.
Bolivia:				
La Paz	Apr. 1-30	5	4	
Brazil:				
Rio de Janeiro	May 8-14	1	1	
British East Africa:				
Kenya Colony—				
Zanzibar	do	12	4	Origin India.
Bulgaria:				
Sofia	May 15-31	6		
Canada:				
Alberta—				
Calgary	May 26-June 18	3		
British Columbia—				
Vancouver	May 28-June 11	5		
Manitoba—				
Winnipeg	May 28-June 18		5	
New Brunswick—				
Westmoreland County	June 5-11	1		
Nova Scotia—				
Sydney	June 5-18	2		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 2 to 15, 1921—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Canada—Continued.				
Ontario—				
Hamilton	June 12-18	3		
Kingston	June 5-11	1		At two localities in vicinity, 2 cases.
London	June 5-25	2		
Montreal	June 12-18	1		
Ottawa	June 12-25	21		
Toronto	do	5		
Saskatchewan—				
Regina	June 5-25	3		
Saskatoon	June 7-27	3		
Chile:				
Antofagasta	May 16-June 5	146	61	
Mejillones	May 30-June 5			Present. Also at interior nitrate plants.
China:				
Amoy	May 8-14		1	
Antung	May 16-25	6	1	
Canton	Apr. 1-30			Present.
Chungking	May 1-14			Do.
Foochow	May 8-14			Do.
Hankow	May 15-21	4	1	
Manchuria—				
Dairen	May 9-22	18	2	
Nanking	May 8-21			Do.
Tientsin	May 8-14	1		Mission hospital.
Tsingtau	May 9-15	1		
Colombia:				
Santa Marta	June 5-18			Present.
Cuba:				
Antilla	do	7		
Matanzas	June 12-18	1	1	
Santiago	June 1-20	10	1	
Ecuador:				
Guayaquil	May 1-31	20		
Egypt:				
Cairo	Mar. 19-25	1		
Finland	May 1-15	1		
France:				
Rouen	May 1-29	2		
Germany				Apr. 24-May 13, 1921: Cases, 8. Additional, Apr. 17-May 7, 1921: Cases, 57; deaths, 7.
Haiti:				
Cape Haitien	May 29-June 18	174		
India:				
Bombay	May 1-7	32	20	
Calcutta	May 8-21	5	5	
Madras	do	11	4	
Rangoon	Apr. 24-May 7	10	2	
Indo-China				Jan. 1-31, 1921: Cases, 102; deaths, 15.
Provinces—				
Anam	Jan. 1-31	35		January, 1920: Cases, 16; deaths, 3.
Cambodia	do	21	3	January, 1920: Cases, 139; deaths, 54.
Cochin-China	do	19	12	January, 1920: Cases, 8; deaths, 1.
Tonkin	do	27		January, 1920: Cases, 224; deaths, 43.
Italy:				
Catania				Province: June 6-12, 1921: Cases, 2.
Palermo	May 18-31	4	1	
Japan:				
Kobe	May 24-30	1		
Nagasaki	May 23-June 5	4	1	
Java:				
West Java—				
Buitenzorg	Apr. 29-May 5	10	2	
Krawang	Apr. 29-May 19	19	2	
Lebak	Apr. 29-May 5	3	1	
Mexico:				
Chihuahua	May 23-June 11		2	
Mexico City	May 15-21	37		
Vera Cruz	June 13-19		1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 2 to 15, 1921—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Panama				Jan. 1–June 10, 1921: Cases, 192, of which 32 were in non-residents.
Canal Zone	Jan. 1–June 10	2		
Colon	do	111		
Panama	do	47		
Poland				Mar. 1–Apr. 30, 1921; Cases, 1,117; deaths, 142.
Bialystok	Mar. 1–Apr. 30	3		
Cracovia	do	56	6	
Kielce	do	189	26	
Leopol	do	52	16	
Lodz	do	72	9	
Lublin	do	397	30	
Posen	do	26	2	
Silesia	do	10		In Teschen.
Stanislawow	do	30	5	
Tarnopol	do	156	31	
Warsaw	do	36	4	
Warsaw city	do	90	13	
Portugal:				
Lisbon	May 15–June 4		22	
Portuguese East Africa:				
Lourenco Marques	May 8–21	6		
Rumania:				
Districts—				
Hotin	Apr. 1–30	40	9	
Orhei	Mar. 1–31	2		
Russia:				
Province—				
Esthonia	Apr. 1–30	6		
Spain:				
Barcelona	May 12–June 8		11	
Malaga	May 1–31		34	
Tarragona	May 9–15		1	
Valencia	May 22–28	1		
Switzerland:				
Zurich	do	5		
Syria:				
Aleppo	Apr. 9–16			Present.
Beirut	May 10–30	1	1	
Tunis:				
Tunis	May 30–June 10	1	2	
Union of South Africa:				
Cape Province	Apr. 24–May 7			Outbreaks.
Natal	do			Do.
Orange Free State	do			Do.

TYPHUS FEVER.

Algeria:				
Algiers	May 1–31	55	8	
Oran	May 22–June 10	22	18	
Bolivia:				
La Paz	Apr. 1–30	32	29	
China:				
Hankow	May 22–28	2		
Egypt:				
Alexandria	May 21–June 3	6	5	
Cairo	Mar. 19–Apr. 1	21	9	
Finland	May 1–15	5		
Germany				Apr. 24–May 7, 1921: Cases, 6.
Great Britain:				
Dublin	May 29–June 4	1		
Japan:				
Nagasaki	May 23–June 5	7	2	
Jugoslavia				Jan. 30–Feb. 5, 1921: Cases, 30; deaths, 8.
Belgrade	May 1–14	6		
Mexico:				
Mexico City	May 15–21	15		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

Reports Received from July 2 to 15, 1921—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Poland				Mar. 1-Apr. 20, 1921: Cases, 11,489; deaths, 1,131.
District—				
Bialystok	Mar. 1-Apr. 30	853	45	
Cracovia	do	603	90	
Kielce	do	848	62	
Leopol	do	2,508	277	
Lodz	do	521	53	
Lublin	do	1,446	83	
Posen	do	77	5	
Silesia	do	26		In Teschen.
Stanislawow	do	1,557	232	
Tarnopol	do	1,855	194	
Warsaw	do	972	61	
Warsaw city	do	223	29	
Rumania:				
Districts—				
Hotin	Apr. 1-30	107	10	
Orhei	Mar. 1-31	80		
Russia:				
Province—				
Esthonia	Apr. 1-30	57		
Siberia—				
Vladivostok	Mar. 1-Apr. 30	4	1	
Syria:				
Beirut	May 20-30		1	
Turkey:				
Constantinople	May 22-June 4	7		
Union of South Africa:				
Cape Province				Apr. 24-May 14, 1921: Outbreaks.
Capetown	May 13-19	10	3	At native cantonment in vicinity.
Orange Free State				Apr. 24-May 14, 1921: Outbreaks.

YELLOW FEVER.

Mexico:				
Alamo	June 1-30	10		State of Vera Cruz.
Vera Cruz	June 13-27	7		
Peru				Mar. 1-31, 1921: Cases, 66; deaths, 25. Apr. 1-30, 1921: Cases, 106; deaths, 32. In 13 localities.
Departments—				
Lambayeque—				
Chiclayo	Mar. 1-31	20	10	
Chongollape	do	2	2	
Ferrenafe	do		1	
Lambayeque	do	15	5	
Monsefu	do	18	4	
Motupe	do	1	1	
Pomalca	do	5	1	
Villa Eten	do	5	1	
Callao—				
Callao	Apr. 1-30	1		At quarantine station. From Chiclayo
Lambayeque—				
Chiclayo	do	23	5	
Chongollape	do	10	1	
Jayanca	do	5	2	
Lambayeque	do	5	2	
Monsefu	do	8	5	
Motupe	do	45	11	
Olmos	do	2	4	
Villa Eten	do	2		
Zana	do	1		
Libertad—				
Guadalupe	do	2		
Pueblo Nuevo	do	1	1	
Trujillo	do	1	1	Country.